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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLII. No. 2995.] LONDON, OCTOBER 6, 1920. [72ND YEAR. PRICE 8d.

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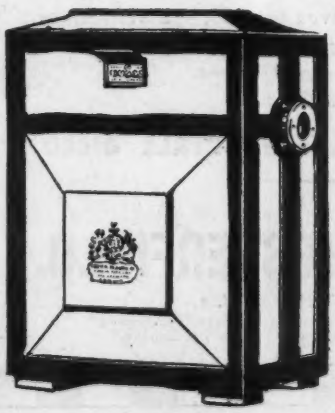

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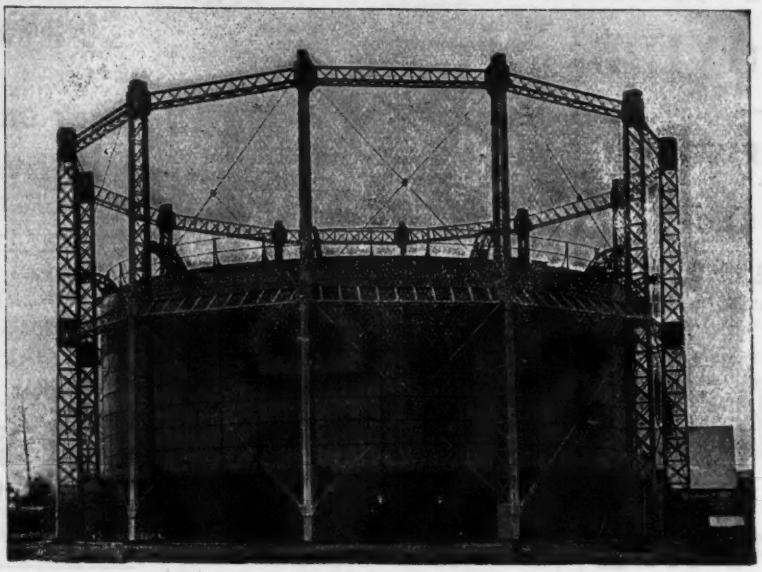

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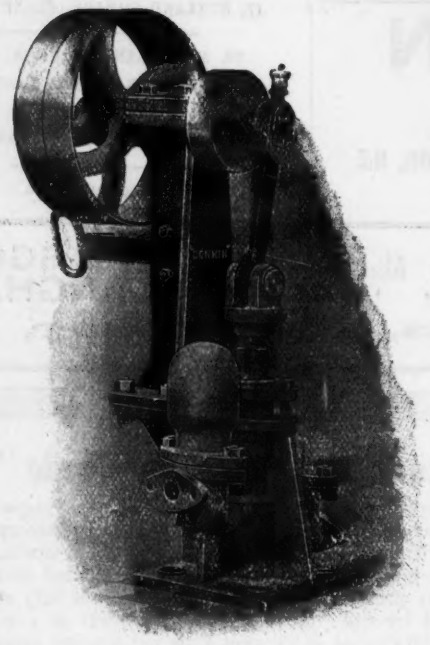

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CLII., No. 2995.] WEDNESDAY, OCTOBER 6, 1920. [72ND YEAR.

EDITORIAL NOTES.

The Rules Governing Applications for Orders.

THE rules made by the Board of Trade to govern applications for Orders under the Gas Regulation Act are not by any means of a formidable character. They were published in the "JOURNAL" last week; and all told there are only half-a-dozen of them. But to find the full requirement of the Board in relation to information, there must be taken, in conjunction with the rules, the prescribed form of schedule and of model forms of application and notice, which intending applicants will be able to obtain as directed last week. But even including these, it will be seen the Board have sought to make application, the particulars needed, and the whole course of procedure as simple and inexpensive as these possibly can be, having regard to all circumstances and interests. No superfluous information is desired by the Board. They will have enough of actual value to consider without being saddled with any more. All they want is to have what is requisite to enable them to form a fair judgment. But it will be observed that the present rules only refer to the applications under section 1 of the Act, and not to the Special Orders which are also provided for in the Act. Section 1 deals with the heat-unit basis and the revision of price, in which connection it will be noticed that there is no mention in the rules themselves of the calorific value which undertakings have to declare. This, however, is not a question that greatly concerns the Board, beyond the fact that the calorific value will have to be declared, and that any change from it can only be made with the consent of the Board.

What the Board in the first instance are chiefly concerned about is the price per therm, or 100,000 B.Th.U.; and the price to be determined is to be a fair one as between consumers and those who provide the capital for carrying on the service. The therm is something definite—definite in quantity and quality; and the conditions of supply which the Act specifies, with the necessary details to be prescribed by the Gas Referees, will ensure that the consumers obtain every therm for which they pay, and nothing short of it. It will be seen that, in the first place, the undertakers will "propose" the price which they consider will be a fair standard or maximum price per therm. The information that they submit, supported by their published accounts, must justify their proposal; and it will be for the Board to see that the information does this. The Board will not act in anything but a judicial manner in this respect; and if they are satisfied that the applicants make out a good case for the price proposed, representations from local authorities or other persons will not affect their decision. Such representations for modifications will have to be substantiated as completely and thoroughly as applicants will have to substantiate their proposals. Thus no good purpose will be served by local authorities or other persons offering a weak case in opposition to that of applying companies.

Under rule 3, it will be observed that applicants have to show in detail the cost of supplying gas for the periods mentioned in the prescribed form, and forward copies of the published accounts, and a statement of the price or prices charged for gas during those periods. A provision which follows calls for a list of enactments which require the undertakers to supply gas of any particular illuminating or calorific value. Looking at the two provisions together, it may be pointed out that the cost of supplying gas and the prices charged may not during the periods specified have had any relation to the enactments as to calorific or illuminating power. Both costs of production and prices to consumers might have been higher if there had, during the last few years, been rigorous adherence to the quality specified in the enactments.

The rules give information as to the public notices that are to be made in respect of applications. Applicants will have to be very precise about their observance of these matters, as otherwise any omission may nullify the application, and the work will have to be done all over again. It is clear that the Board do not intend that local authorities or other persons shall be permitted to cause unnecessary time obstruction. If they have any representations to make on the subject of the applications, they are to be submitted before a date which will be fixed in the notice, which is not to be less than 21 days after the date on which the publication and service of notice are completed. Copies of the representations that they make to the Board are to be forwarded at the same time to the applicant undertakings, who will reply to them, sending a copy to the Board, and to the authority or person making the representation. Not only are the Board unwilling to allow the proceedings over an application to be unduly prolonged, but the idea of simple procedure runs through the rules. As far as possible, all investigation is to be done in writing, and not by formal inquiry. But, of course, the Board have discretionary power to hold local inquiries if thought expedient by them. In addition to the ordinary fees (which are moderate and have a three-stage gradation according to the size of the undertaking), rule 6 provides for any extraordinary expenses incurred in connection with a local inquiry being borne by the applicant undertaking. This provision does not strike us as being altogether fair. The gas industry has had large experience of local authorities instituting vexatious proceedings in Parliament, and running a concern into enormous expense, and then unable to justify their action. The costs should, in justice, follow the result; and it is time that this, as in legal actions, was recognized in parliamentary and departmental proceedings.

Schedule and Instructions.

BY the courtesy of the Board of Trade, we are able this week in later columns to give the schedule of the financial and other information that they will require to be furnished by applicants for Orders under Clause 1 of the Gas Regulation Act. The information will have to be supplied on the official form; but in anticipation of a copy being received in answer to a request for the prescribed form of schedule and of model forms of application and notice, the table can be easily constructed from the particulars we publish to-day. The first data needed will be, for the various periods stated, the quantity of gas sold, calorific value, &c. Then follows the main part of the table, the headings of which are (as will be seen) lettered from "A" to "X;" and on the left-hand side of the table will appear the items Nos. 1 to 49. It will be a simple matter, though occupying a little time, to supply all the data asked for; and the publication in our columns this week will enable the responsible gas officials to be getting on with the work, so that when, in compliance with their formal request, a copy is forwarded to them from the Board of Trade, it will only be necessary for them to fill-in the information from the rough draft.

One thing that may be pointed out in connection with this schedule is that the year 1912 was the one of the great coal strike; so that for some time during and after the strike the financial position was not normal, and many gas reserve funds felt the effects severely. Thus the difference in production costs now actually obtaining and those that obtained in 1912-14 cannot be said to show the full difference between present costs and those of a pre-war normal year. This

point should be borne in mind as one which warrants generous consideration, although it is not, of course, possible for the Board to do anything else than to gauge, by the annual and average figures immediately preceding the war, what "addition" (quoting from sub-section 3 of clause 1 of the Gas Regulation Act) is "reasonably required in order to "meet the increases (if any) due to circumstances beyond "the control of, or which could not reasonably have been "avoided by, the undertakers, which have occurred *since* "the 30th of June, 1914, in the costs and charges of, and "incidental to, the production and supply of gas by the "undertakers." Still there is no harm in suggesting that the point mentioned should be kept in mind when considering decisions.

Farthing or 0·2d. Movements per Therm.

The discussion initiated by Mr. H. E. Ibbs in last week's "Journal" on the advisability of adopting a definite fraction of a penny as the basis for movements in charging for heat units, is continued this week by Dr. Carpenter, Mr. Frank Day, and "Provincial," in our "Correspondence" columns; and by our old contributor "Engineer" in an article. We did not expect that the submissions and contentions of Mr. Ibbs would be accepted without discussion from other points of view; and it is desirable that they should be subject to a thorough investigation by those chiefly concerned, as this is one of those matters upon which free discussion will assist in the formation of correct decision. It also helps us to appreciate that the change the Gas Regulation Act has introduced into the gas industry has opened up many new polemical avenues, both technical and commercial. It is, however, the fundamental question of price movements per therm which is important to-day; and there is indebtedness to Mr. Ibbs for supplying the industry with such a well-considered foundation for thought and argument—or agreement.

The tenor of Mr. Ibbs's article was that price movements of 0·2d. per therm, or multiples thereof, have claims superior to other fractions of a penny, or even to the lowest value coin in our currency. Dr. Carpenter and Mr. Day take a contrary view, and contend that price variations per therm should be those which the public can best understand. There is weight in this contention, though, as a matter of fact, we do not think the public will concern themselves much over what appears after the whole number per therm. For example, a domestic consumer who uses in a quarter 100 therms at 11·2d. per therm, will be more concerned about the £4 11s. 8d. which the 11d. represents than the 1s. 8d. which the odd 0·2d. represents. We have, too, the tariffs and percentage increases of our electrical friends as illustrations of business conducted with charges which step outside the definiteness of a coin of the realm. Mr. Day dips farther into the argument than Dr. Carpenter, and shows how the ¼d. will work under the sliding-scale, in respect of which he sees no difficulties. The same applies to the dealings had with the prepayment meter consumer. "Engineer" points out that everybody will at once rule-out the second place of decimals, and no one will attempt to keep to the exact charge per 1000 c.ft. The fight therefore seems to be between 0·2d. and ¼d. movements in the price per therm. Like Dr. Carpenter and Mr. Day, "Engineer" is of opinion that the public would favour farthing movements as being more easily comprehended; but, on the other hand, the 0·2d. gives closer working and greater flexibility. "Engineer" also deals extensively with the questions of the sliding-scale and the prepayment consumers under the therm system. In the anticipation that Mr. Ibbs will deal with criticisms, and suggestions alternative to his own, we merely mention the points made, in order to direct attention to the discussion.

There are two suggestions which it is due to "Provincial" and "Engineer" that we should emphasize. The former correspondent expresses the view that the time is opportune to call district conferences of gas accountants, for the purpose of formulating rules consequent upon the new conditions that will shortly become operative. He mentions that not only the points raised by Mr. Ibbs but others which he suggests might be dealt with at such conferences. If this idea commends itself, then, in order that the conferences may be thorough in representation, the work of organizing them, we think, should be taken up officially by the National Gas Council. In his article, "Engineer" suggests that, with the view of regularizing applications to the Board of Trade, and of bringing before the notice of the Board the matters raised by Mr. Ibbs and the developments in his own article, there should be a small deputation from the National Gas Council to the Department. He believes this would result in obtaining a more complete understanding of the machinery with which it is intended to operate the Act. These are two suggestions which might at once be considered by the Central Executive Board of the National Gas Council; and, if thought desirable, they could be acted upon without delay. Regarding the deputation to the Board of Trade, the Department is at the present time busy perfecting the machinery which will fulfil the duties of the Board and complete the system instituted under the Gas Regulation Act. The publication by us of rules and schedule governing applications for Orders shows that the Board are moving forward with their new work at as fast a pace as prudent and full consideration will allow. So far, there is satisfaction with the procedure they have mapped-out. Supplementing this, however, the gas industry would like to know who will be the Gas Referees and the Chief Gas Examiner. It would be pleased to learn that these authorities are at work, as the continuously recording calorimeter which they have to prescribe, as well as the conditions of testing which have been entrusted to their framing, are highly important elements in the working and success of the new scheme.

A Second Ballot.

The coal crisis is still with us, and will continue to be so until we know the result of the pending ballot of the miners as to whether they are prepared to accept the new basis of payment on output as proposed by the coal owners. While there is life, there is hope; while there is no strike, there is hope that one will be averted by the discovery of a mutually satisfactory basis of settling the matter from which the present position has gradually grown. In considering the chances of an intransient peaceful ending to the present situation, too much weight must not be put on the threatenings and hostility of the extremists or hotheads in the mining industry, who are still clamouring for an immediate increase in pay of 2s. per shift. We firmly believe that among the miners there are a large majority who, left to their own free will, and not subject to the bit and bridle of the Executive of the Miners' Federation or the influence of local extremists, are anxious for a fair deal, and a fair deal can only be obtained by finding some sound basis upon which advances of pay can be made in relation to increased production. One of the two good things that came out of last week's search for a datum-line of production was the pronouncement of the Executive Committee of the Miners' Federation that they agree that an increase in the output of coal is essential to the well-being of the country; that they concur in the view that output can be improved by mutual goodwill between the owners and the workmen; and that to give effect to this goodwill, they are in favour of the setting-up of National and District Committees to obtain an increased output. When the Miners' Federation look at the matter nationally, and not from the point of view of the miners only, with an ever-suspicious eye on the owners, then the outlook becomes much brighter.

The disposition of both the miners and owners to co-operate to improve output was one of the satisfactory features that was allowed to escape from the datum-line conferences last week. These were held behind closed doors. Everybody was well aware there would be difficulties in finding a datum-line that would appeal to, and find acceptance by, all views and ideas. The owners were firm but not adamant. They put forward a scale of output, and increases based on advancing output, that they knew from experience to be reasonable. The original offer was 1s. advance per shift for men (youths and boys came on lower rates of pay increase) when the output was at the rate of 242 million tons per annum; 2s. when it was 250 million tons; and 3s. when it was 260 million tons. This was unacceptable. There was a division of opinion in the miners' camp. Some wanted a datum-line fixed that would give at once the 2s. advance that had been asked for. This was the whole point. The owners wanted some incentive to an increased production; whereas history has repeatedly assured us that, in the case of the miners, increased pay has meant a shrinkage of output, which is the way to ruin. However, the owners lowered their datum-line to 240 million tons with 1s. per shift increase; and with an additional 6d. for every 4 million tons

advance, until 3s. increase was reached with a 256 million ton output. The 240 million datum-line means an average of 4,800,000 tons per week, working fifty weeks in the year. This figure has frequently been reached this year. Therefore, the output named can be achieved, and easily; and another 16 million tons would mean an increase of at least 15s. per week of five shifts. This is not asking for something unattainable. It has been done before; and many more men are now at work than in 1913.

However, with all the goodwill and effort that were seen and felt in the early part of the week, by the middle there was a deadlock. With the deadlock came gloom. Then conferences followed with the Prime Minister. Again reason got ascendancy; and it was agreed to submit the new offer to a vote of the miners, and leave acceptance or rejection to their unfettered judgment. We may know what that judgment is seven or eight days hence. A delegate conference of the miners will be held on the 14th inst.; and two days later the strike notices, according to present programme, will expire. But the offer is good and fair. The miners know that the potential productive capacity of the mines, even under present conditions, is well ahead of current output; that they can succeed in materially adding to their pay by making a little more effort; and that a strike would severely injure any immediate prospect of having more money. Co-operation and good sense can do much for the country and the miners. Our only fear at the moment is that the insidious unofficial work of the extremists will sway the men. It is a struggle now between the extremists and the moderates to influence votes. The way things have been drifting hitherto has left the country and its millions of people who are not miners entirely out of the question. Their part and interest are restored upon output becoming the basis of higher pay.

The Hiring-Out Policy.

THE extension of the hiring-out of gas appliances has now been abandoned by not a few gas undertakings—mainly on account of financial considerations, and partly because the deliveries of appliances is only about equal to the demand for sale outright. The latter is quite a legitimate reason, but one from which we are escaping through the increased efforts of manufacturers. As to the former, while money is dear, there is nothing to prevent hire-rates being fixed at a point to cover financial obligations. The abandonment of hiring-out, we take it, is only a temporary arrangement; and meantime various gas undertakings have been busy selling to householders, at reasonable and tempting cash prices, the appliances which they have hitherto had in use at a rental, while continuing hiring-out where the option of purchase is not exercised. This is an excellent policy in one respect, as householders, having obtained possession of the appliances, are not likely to displace them for some other form. The temporary abandonment of the hiring-out policy for gas appliances is the opportunity of electrical undertakings to adopt a hiring-out system. They were at a disadvantage in the days when money, appliances, and labour were cheaper, in that the municipal undertakings were then debarred from engaging in business that was to the detriment of the local electrical contractors. So far, however, as hiring-out is concerned—but not sale—the embargo was removed by the Electricity Supply Act of last session, and authorization was granted. Some electricity undertakings have already taken advantage of the powers, and are letting-out appliances and even wiring on hire. The new policy will extend. The Electrical Press are now, almost week by week, parading the reasons which the writers consider should weigh with electrical undertakings in putting a hiring-out scheme into operation. These reasons, it is true, are greater than are found in connection with gas undertakings, because everything is dearer in electrical installation and operation; and unless inviting terms are put forward to ease the way to introduction, the progress of electric heating and cooking will continue to be at the slow pace that has hitherto obtained, quite apart from the distressing experiences of the users as to high operating cost, unreliability and so on, after the appliances are installed, which experiences circulate with amazing rapidity. But if report in the electrical papers be true (and we have no cause to doubt it) the manufacturers of electric heating appliances have been providing large stocks to meet the expected boom in the demand for them on the coming of the hiring-out systems. According to statement, short supply will not be a deterrent to the adoption of the hiring-out system for cookers, radiators, water-heating appliances, and other less important household devices.

The gas industry is observant, and will note this change in competition. It is correct that the gas industry is in the superior position with its heating agent and appliances for all culinary work, for domestic heating, and hot water supply, which are the three main directions in which the electricity undertakings will be pushing the hiring-out business. The new electrical policy in hiring out will be partially—in fact, largely—stemmed by the lower running costs in gas operation, the greater rapidity in the performance of functions, and the greater reliability of appliances. But there will be people who, if they can get electrical appliances on the hire system, and cannot obtain gas appliances by the same route, will for that reason and that alone, without thinking much of the quarter-day consequences, be persuaded to enter into an agreement with the electrical undertaking; and we may be certain that the latter will institute such conditions as to ensure the hiring-out fees for a number of years, and so protect themselves financially. Some gas men may pooh-pooh all this, and decline, on the ground that experiences will in the long-run go in favour of gas, to re-establish the hiring-out system, on learning that the local electrical concern has inaugurated the policy. On this point we have no doubt whatever that the ultimate advantage will be on the side of gas supply. But at the same time it will be better that householders and others should not be allowed to find an initial convenience on the side of electricity which gas undertakings are unprepared to offer. Electrical hiring-out must be countered by gas hiring-out. At this stage of new policy and methods in the gas industry, the broad view must be taken; and there must not be too much generosity in allowing our electrical competitors an advantage which it is not more difficult for the gas industry to offer than for them. It is, as a matter of fact, worse for them, looked at from the financial standpoint. Electrical appliances for rendering equal service cost more than gas appliances. Electrical appliances are more complicated, which influences cost of both production and maintenance. Money is as dear for electricity as for gas undertakings; and so are materials and labour. The cost in their case for producing equivalent service is greater than in that of gas concerns. Therefore, if they can now offer hiring-out terms, so can gas undertakings. All things considered, it seems to us that where the hiring-out system has been dropped in connection with the gas business, it should be revived as early as possible, though necessarily on new but competitive terms.

"B.C.G.A." Conference at Sheffield.

To excel previous performances is the ambition and effort of the Executive Council and officials of the British Commercial Gas Association. They do not look back; their business is with the present, and, as far as active minds and long-sightedness will allow, with the future. The programme arranged for the annual conference at Sheffield for Tuesday and Wednesday, Oct. 19 and 20, is impressed with these characteristics; and it is something of which those responsible may be proud. The programme is printed practically in full in other columns; the only fear we have as we contemplate it is that the discussion of the important subjects will suffer from the fact that there are not more than sixty minutes in an hour. However, the President is Sir Robert Hadfield; and the Lord Mayor of Sheffield and Lieut.-Col. H. K. Stephenson, the Chairman of the Gas Company, will unite with the great industries of the city as represented by Sir Robert in welcoming all who attend. The Gas Company will be prominent as hosts. Even if there is a coal strike (partial or complete), railway trains will not stop running; and so we feel that the programme is of a character, and the change that is about to come upon the industry is of such sweeping significance, that there will be an attendance that will excel all previous occasions. Several of the topics should enable much to be said on thinking and selling on the heat-unit basis.

Causes of Blindness.

The Ministry of Health have appointed a Committee to inquire and report on the causes of blindness. We hope the Committee—over which the Rt. Hon. G. H. Roberts, M.P., will preside—will consider the question of the effect of artificial lights upon vision, and ascertain why it is a greater number of indoor

workers have had the last few years to take to optical aids—particularly in banks and insurance offices. The Committee will no doubt hear much about the relative intrinsic brilliancy and spectra of different lights; and perhaps they will make a point of insisting upon the necessity of preventing the use of such high intrinsic brilliancy lamps as those of the metallic filament and "half-watt" types without proper protection for the eyes.

Home Produced Fuel Oil.

The gas industry is interested in all developments which create a demand to the satisfaction of which their secondary products can contribute; and especially is this so in the case of those undertakings that do their own tar-distilling, or are concerned in co-operative tar-distilling schemes—such as those which exist in southern parts of the country. The Diesel engine has made a claim for fuel oils; and we well remember how, during the war, gas undertakings were urged to carbonize with a view to the production of more fuel oil for the purposes of our warships. For marine use, coal is slowly but surely being displaced by oil. Steam-driven ships (the "Petroleum Times" has pointed out) are turning to oil-fuel for their boilers, and in another direction steam is giving way to the internal combustion engine. Even in the short space of one year, the advance has been little less than remarkable. At June, 1919, the oil-fired vessels numbered 1200; at June last, 1850. The motor ships numbered 924 at June, 1919, and 1100 at June last. During the twelve months, the world's shipping has increased by about 9 p.ct.; but oil-fired and motor-driven vessels have increased by upwards of 35 p.ct. The progress will continue at even greater speed.

Coal Output.

It is interesting to keep watch upon the output of coal while the discussion is proceeding regarding the payment to the miners of increased wages upon an enhanced output. During the week ending Sept. 18, the output of coal was 4,708,900 tons. The deliveries from the pits during the preceding three weeks were: Aug. 28, 4,590,000 tons; Sept. 4, 4 750,000 tons; and Sept. 11, 4,606,800 tons.

Flame Length.

This is an important consideration in connection with the question of high and low grade gas. Mr. J. H. Dawe dealt with it in respect of only one application—that of boiling—in the paper he read before the Manchester District Junior Gas Association last Saturday. For boiling purposes, short flames of low-grade gas are very suitable, so long as the position of the vessel containing the liquid admits of flame contact—more so than the long flames of higher grade gas, which go tailing-up the sides of the vessel, and create smell and waste of heat, and therefore of gas, unless the gas regulation is in the hands of a careful consumer. The "careful consumer" is not found in all households. Thus low-grade gas, with its shorter flames, is an aid to domestic economy in connection with boiling operations. But for gas-fires a larger volume and longer flames are desirable with the elongated fuel of the present day. In this connection, it is extraordinary, after all that has been said, what an amount of ignorance still prevails, among some classes of servants of the gas industry dealing with the sale of gas, as to the approximate equality in B.Th.U. of the gas and air mixture delivered at the point of combustion whether the gas be what is termed high or low in calorific value per cubic foot. This is a matter which, in the interests of the movement to lower calorific values on grounds of economy, should be of general knowledge among sales officials.

The Foreman Affair.

Even matters which trifle with commonsense may have their developments. There was the Penistone foreman affair, which led the Electrical Trades Union and many of its members into a most unhappy and undignified position, with the result that nothing was gained by all that happened, and by all that was threatened. The London Electric Supply Companies were naturally very incensed over the menace to themselves and their customers through the Union being engaged in a dispute at Penistone. The Companies have now given the Union to understand that they will not accept strike notices given by the Unions or shop stewards on behalf of the men, and will only recognize notices given by individual employees. Another development is that the Amalgamated Union of Shipbuilding, Engineering, and Constructional Workers, and the Federation of Foremen's Associations have agreed that in the event of an officially recognized dispute between either body and the employers, the other shall observe strict neutrality, and shall not take the place, temporarily or otherwise, nor perform the duties, of any member who may be affected, and not accept the supervision or instruction of anyone who may be put in the place of any such member.

PERSONAL.

NEWCASTLE APPOINTMENT.

We are pleased to learn that the appointment has been offered to, and accepted by, Mr. F. P. Tarratt, of Darlington, as Chief Engineer to the Newcastle-upon-Tyne and Gateshead Gas Company, in succession to Mr. Thomas Hardie, whose forthcoming removal to London as Deputy Chief Engineer of the Gas Light and Coke Company was a few weeks ago intimated in the "Journal." Mr. Tarratt went to Darlington in 1898 (upon the death of Mr. J. S. Nicholls), previous to which he was for some years Assistant at the Aylestone Road gas-works of the Leicester Corporation, where he received his training under the late Mr. Alfred Colson (then Engineer and Manager of the Leicester Corporation Gas Department). During the time he was engaged at Aylestone Road, a new section of the works was erected in its entirety.

Since Mr. Tarratt took up his present appointment at Darlington—where he has had the entire management of the undertaking, both of the commercial and technical side—the annual make of gas has increased from 270 million c.ft. to 520 millions, and the number of consumers has trebled. A great development has taken place in Darlington during the past ten years, chiefly owing to the North-Eastern Railway Company having centralized their locomotive works there, which has necessitated the laying of many miles of main. Within recent years 50 miles of main have been laid, including several miles of high-pressure main, which has permitted the adoption of automatic control from the works of the public lamps throughout the town and district.

During Mr. Tarratt's management, the Darlington works have been remodelled and largely extended. Since 1906 there has been erected a new gasholder and tank (1¼ million c.ft. capacity), together with governor-house and governors. De Brouwer stoking machinery has been installed in the horizontal retort-house. In September, 1914, he brought into use a Glover-West vertical retort plant (2 million c.ft. capacity), complete with coal-stores, high-level railway sidings, river retaining walls, condensers, tar and ammoniacal liquor storage tanks, washers, purifiers, telpher for handling and storing coke, including screens and hoppers, together with electric generating plant, all of which were planned entirely by him, with the aid of his permanent staff. These works, which were erected on a new site, were described and illustrated in the "Journal" for Nov. 24, 1914 [pp. 410-414].

The working costs at Darlington compare favourably with towns of similar size. The net cost into the holder in 1916 was 10·6d. per 1000 c.ft.; and the selling price of gas prior to the war was 1s. 10d. to 2s. for lighting, and 1s. 3d. to 1s. 6d. for power purposes. Owing, however, to the increase in wages, and abnormal price of coal and all works requirements, the price had to be raised.

Mr. Tarratt is a member of the Council of the Institution of Gas Engineers, and at the present time the Municipal Representative of the North of England on the Committee of the Federation of Gas Employers.

Mr. J. G. Cleater, who was formerly Assistant Manager, and lately Deputy Manager of the Mid-Kent Gas Company, has been selected to succeed the late Mr. E. M. Beecham as Manager of the Cirencester Gas Company, Ltd.

The Nottingham Gas Committee have further considered the question of the appointment of a Gas Accountant in succession to Mr. Garton, and recommend that Mr. R. H. Mason, A.S.A.A., who has been in the department for a number of years, and has for some time occupied the position of Chief Assistant to Mr. Garton, be appointed to the position, under the supervision of the City Treasurer and the General Manager.

Dr. F. Mollwo Perkin, D.Sc., Ph.D., F.I.C., has had conferred on him the Order of Commander of the British Empire.

Temporary Increase of Charges Act.—Orders have been made by the Ministry of Health under the Temporary Increase of Charges Act authorizing the Denton Urban District Council to increase the maximum amount charged for gas from 5s. to 7s. 6d. per 1000 c.ft.; the East Dereham Urban District Council, from 5s. to 7s. 6d. per 1000 c.ft.; the Shoeburyness Urban District Council, from 5s. 6d. to 6s. 8d. per 1000 c.ft.; the Sidmouth Urban District Council, from 7s. (under a previous Order) to 7s. 6d. per 1000 c.ft.; the Spalding Urban District Council, from 5s. 6d. to 8s. 3d. per 1000 c.ft.; the Torquay Corporation (St. Mary Church), from 5s. 6d. to 8s. 3d. per 1000 c.ft.; and the Warrington Corporation, from 5s. (under a previous Order) to 6s. per 1000 c.ft. Applications for Orders have been received from the Town Councils of Blackburn and Plymouth, the Urban District Councils of Briton Ferry, Clacton, Glyncorrwg, Kirkby-in-Ashfield, Lymm, and Prestatyn, and the Wath, Bolton, and Thurnscoe Gas Board.

GAS REGULATION ACT, 1920.

INFORMATION REQUIRED IN MAKING APPLICATIONS FOR ORDERS.

SCHEDULE AND INSTRUCTIONS.

IN last week's issue [p. 661], we gave the rules that are to be observed in making applications to the Board of Trade for Orders under clause 1 of the Gas Regulation Act. Through the courtesy of the Board, we are enabled this week to let the industry know the nature of the information that will have to be supplied in the prescribed form of schedule, copies of which (with model forms of application and notice) will have to be obtained from the Assistant Secretary, Power, Transport, and Economic Department, Board of Trade, Great George Street, S.W.

The Schedule consists of a large table 24 in. by 28 in. Though extensive in area, there will be no difficulty in supplying the data that the Department needs.

NAME OF UNDERTAKING.

At the top of the schedule, there is space for the name of the undertaking.

QUANTITY OF GAS SOLD, CALORIFIC POWER, &c.

The first three items upon which information has to be given are:

1—Quantity of Gas Sold.

2—Prescribed Standard (Calorific or Illuminating).

3—Average Calorific Value (Actual or Estimated) Supplied.

The information under the above headings will be required for:

The year to June 30, 1912.
" " " 1913.
" " " 1914.
Average for the three years to June 30, 1914.
Year to Dec. 31, 1919.
Accounting Period (if any) subsequent to December, 1919.

EXPENDITURE, INTEREST, AND REVENUE.

The next part of the Schedule is divided into nine vertical sections; and the information required refers to expenditure, interest, and revenue. The first six vertical sections are each divided into three lettered columns:

For example—

Year to June 30, 1912.

A.	B.	C.
Details.	Amount.	Per 1000 c.ft.
£ s. d.	£ s. d.	£ s. d.

Columns **D, E, F** require the same information for the year to June 30, 1913.

Columns **G, H, J** require the same information for the year to June 30, 1914.

Columns **K, L, M** require the average of the information for the three years to June 30, 1914.

Columns **N, O, P** require the same information for the year to Dec. 31, 1919.

Columns **Q, R, S** require the same information for the accounting period (if any) subsequent to Dec. 31, 1919.

The final three vertical sections are highly important, and are as follows:

Additions or Deductions on Account of Alterations in Wages and Changes in Price of Coal and Materials, &c., not reflected in last Published Accounts.	Cost of Supplying Gas at Present Time.			Remarks (including statements as to any anticipated additions to, or deductions from, items in Cols. U, V, W.
T	U	V	W	X
£ s. d.	Details. £ s. d.	Amount. £ s. d.	Per 1000 C.Ft. £ s. d.	

The information that must be supplied in Columns A to W is the following:

EXPENDITURE.

1. Coal (including freight and labour).

Less:

Residuals—namely:

2. Coke.
3. Breeze.
4. Tar and Products.
5. Ammonia and Products.
6. Sundries.
7. Total Residuals.
8. Net Cost of Coal.
9. OIL. } For Water Gas
10. COKE AND BREEZE. } Manufacture.
11.

Manufacturing Expenses:

12. Salaries and Wages.
13. Purification.
14. Repairs and Maintenance of Works and Plant.

Distribution Expenses:

15. Salaries and Wages of Officials (including Rental Clerks).
16. Repairs and Maintenance, and Renewals of Mains and Service-Pipes.
17. Do. of Ordinary Meters.
18. *Less* Rent of Ordinary Meters.
19.
20. Do. of Stoves.
21. *Less* Rent of Stoves.
22.
23. Do. of Prepayment Meters and Fittings.
24. *Less* Rent.
25.
26. **Rent, Rates, and Taxes.**
27. *Less* Rents received.
28.

Management Expenses:

29. Office Salaries and Collectors' Remuneration.
30. Directors' Allowance.
31. Other Charges.

Miscellaneous Expenses:

32. Superannuation, Sick and Accident Funds.
33. Copartnership.
34. War Bonus and War Fund.
35. Leasehold Renewal Fund.
36. Other Charges.
37. TOTAL NET EXPENDITURE ON REVENUE ACCOUNT.
38. **Interest on Temporary Loans and Consumers' Deposits.**
39. *Less* Interest Received.
40.
41. **Interest on Debentures or Mortgages.**
42. Other Charges.
43. TOTAL EXPENDITURE, including Interest.

REVENUE.

Gas-Rentals.

44. Private Consumers.
45. Public Lighting.
46. *Less* Charges.
47. TOTAL REVENUE.
48. *Less* Total Expenditure (including Interest) as above (line 43).
49. BALANCE.

From the above, it will be seen that a good deal of information is needed, but it is all of a character that is readily ascertainable. On the face of the Schedule appear the following:

INSTRUCTIONS.

1. The figures in columns "A," "B," "D," "E," "G," "H," "N," and "O" are to be taken from the published accounts. In cases where published accounts are not available for the periods specified in the headings of these columns, the figures should be taken from the published accounts for the last completed year prior to the specified date, and the headings should be altered accordingly.
2. The figures to be inserted in columns "Q" and "R" are those contained in the latest published accounts of the undertaking.
3. The figures in columns "C," "F," "J," "M," "P," "S," and "W" are to be calculated by dividing the figures in the two preceding columns by the number of thousand cubic feet of gas supplied in the year in question.
4. If any increase or decrease in expenditure compared with the figures in the last published accounts (columns "Q" and "R") has occurred, on account of changes in the rate of wages, or in the price of coal or materials, &c., during the currency of the last half year (or year, as the case may be), or subsequent to the close, the extent to which the expenditure has been so increased or decreased must be shown in column "T." Full particulars of such additions and deductions, and of the manner in which the extra or decreased costs are calculated, must be given in column "X," or on a separate sheet.
5. Upon adding or deducting the figures given in column "T" to or from those given in columns "Q" and "R," the estimated cost of supplying gas at the present time is arrived at (columns "U," "V," and "W").

6. If depreciation is included in any of the items Nos. 14, 16, 17, 20, or 23, the amount should be separately stated in each case.
7. The amount of income-tax (if any) included under rents, rates, and taxes should be noted separately.
8. The "Details" columns are for the insertion of figures referring to two or more items where additions or deductions have to be made, in order to arrive at a net total of expenditure or receipt. For instance, as regards coal, the gross cost of coal will be shown on line 1 in the "Amount" columns. The residual receipts under each head will be shown on lines 2 to 6 in the "Details" column; the total residual receipts being extended (on line 7) into the "Amount" columns, and then deducted from the gross cost of coal—thus arriving at the net cost of coal, line 8.

BRITISH COMMERCIAL GAS ASSOCIATION CONFERENCE.

Programme.

The Ninth Annual Conference of the Association is to be held in the Cutlers' Hall, Sheffield, on Tuesday and Wednesday, Oct. 19 and 20, under the Presidency of Sir Robert A. Hadfield, Bart., F.R.S., D.Sc. The Vice-Presidents of the conference are Lt.-Col. H. K. Stephenson, D.S.O., M.P., LL.D., J.P. (Pro-Chancellor of the University of Sheffield and Chairman of the Sheffield Gas Company), Mr. D. Milne Watson, M.A., LL.B. (President of the National Gas Council), Mr. Thomas Goulden, M.Inst.C.E. (President of the Institution of Gas Engineers), and Sir Arthur M'D. Duckham, K.C.B. (President of the Society of British Gas Industries).

The subject of the conference is to be the "Gas Industry as a Factor in National Economy;" and it will be divided into four sections—the National Economy Section (Chairman, Mr. D. Milne Watson), the Domestic Economy Section (Chairman, Alderman W. Kay, J.P., of Manchester), the Industrial Economy Section (Chairman, Alderman A. J. Hobson, LL.D., J.P., Pro-Chancellor of the University of Sheffield; Deputy Chairman, Prof. C. H. Ripper, D. Eng., D.Sc., &c., Dean of the Faculty of Engineering, University of Sheffield), and the Business Development Section (Chairman, Lt.-Col. H. K. Stephenson). The first three sections will be open to the public by invitation, but the fourth to members of the Association and other representatives of gas undertakings only.

ORDER OF PROCEEDINGS.

TUESDAY.

10.45 Assembly of Conference (open to visitors).

11.0 Address of Welcome by the Lord Mayor of Sheffield.
Address of Welcome by the Chairman of the Sheffield Gas Company (Lt.-Col. H. K. Stephenson).
Reply by President.

11.30 **Presidential Address** by Sir Robert Hadfield. Subject: "Economy."
Vote of thanks to President.

12.20 Paper on "Giving Value for Money: the Opportunities and Obligations of a Great Public Service," by the Executive Chairman of the Association (Mr. F. W. Goodenough).

12.55 Announcement of election of President and Auditors for ensuing year.

1.0 Adjournment.

1.15 Luncheon to the President, Vice-Presidents, members, and visitors, by the Chairman and Directors of the Sheffield Gas Company.

3.0 **Public Conference** (National Economy Section).
Subject for Discussion: "Gas as an Aid to National Economy—The Conservation of Coal, Energy, and Life."
Opening Remarks by Chairman (Mr. D. Milne Watson).
Papers (followed by discussion) on "The Conservation of Coal," by Mr. Thomas Goulden. "The Conservation of Energy," by Mrs. M. A. Cloudesley Brereton, Officier d'Académie, Member of Royal Sanitary Institute, Fellow of Institute of Hygiene and of Institute of Public Health.

4.45 Adjournment. Tea served.

7.0 **Public Conference** (National Economy Section) resumed.
Reception by the Lord Mayor and Lady Mayoress.
Coffee. Music.

7.45 Lecture by Dr. C. W. Saleeby, F.R.S.Edin., "The Conservation of Life."

9.0 Light Refreshments. Music.

WEDNESDAY.

10.45 Assembly of Conference.

10.50 Consideration of report and accounts for year 1919-20.

11.15 **Private Conference.**
Subject for Discussion: "Business Development in the Gas Industry."
Papers (followed by discussion) on "Attracting Attention and Creating Interest" (National Publicity; District Publicity; Local Publicity—How the B.C.G.A. creates the foundation for and assists in the carrying out of Local Business Development), by Mr. W. M. Mason, Secretary of the Association (Kinematograph films advertising the uses and advantages of gas will be shown in an adjoining room throughout the Conference). "Show-rooms and Offices—their Design, Planning, and Equipment," by Mr. H. Austen Hall, F.R.I.B.A., Past Pres. Archl. Assocn. (Consulting Architect to the B.C.G.A.). "The Economy of Efficiency," by Mr. F. H. Holland (Director of Sales Organization). "Obtaining and Maintaining Business," by Mr. F. W. Goodenough (Chairman of Executive).

1.30 Adjournment.

3.0 **Public Conference** (Domestic Economy Section).
Subject for Discussion: "Gas as an Aid to Economy in the Building, Equipment and Running of the Home."
Reception of Members and Visitors by the Chairman and Vice-Chairman. Tea and Coffee served.
Opening Remarks by Chairman (Alderman W. Kay, J.P.).
Papers (followed by discussion) on: "Fuel Research at Leeds University," by Prof. John W. Cobb, C.B.E., B.Sc., F.I.C. "Fuel Research at University College, London," by Prof. A. H. Barker, Whitworth Scholar, B.A., B.Sc. "Domestic Uses of Gaseous Fuel, its Economic and Hygienic Aspects" (Cooking, Warming, Water-Heating, Washing), by Mr. Samuel Tagg. "Economy in Building Construction through the Use of Gaseous Fuel," by Mr. P. S. Hoyte and Mr. W. J. Swain, F.R.I.B.A. "Gas for Lighting in Housing Schemes," by Mr. Harold Bloor, B.Sc., B.Eng., and Dr. Samuel Rideal, F.I.C.

3.0 **Public Conference** (Industrial Economy Section).
Subject for Discussion: "Gas as an Aid to Economy in the Factory and Workshop."
Reception of members and visitors by the Chairman and Vice-Chairman. Tea and coffee served.
Opening Remarks by Chairman (Alderman A. J. Hobson).
Papers (followed by discussion) on "Economies—of Time, Labour, Space, Buildings, Material and Fuel in Industrial Processes," as illustrated by: Installations in Sheffield, by Mr. S. T. S. Musgrove. Installations in Birmingham, by Dr. C. M. Walter. Installations in London, by Mr. B. W. Brooks. Installations in Newcastle, by Mr. A. B. Roxburgh. "Coke for Steam Raising," by Mr. E. W. L. Nicol (Fuel Expert, London Coke Committee).

5.30 Adjournment.

5.40 Tea for all attending both afternoon conferences.

Some New Experiments with Straw Gas.

At the experimental farm of the United States Department of Agriculture, at Arlington (Va.), a gas which is obtained by the destructive distillation of wheat, oats, and rye straws is now being produced upon a small scale; but though an automobile has been operated with the new combustible, and it has been used for illuminating purposes as well as for cooking, the possibilities of straw gas have not yet been fully determined. In order to determine the exact commercial value of the gas, further tests are in contemplation. It is intended to carry out work which will determine the quantity and nature of the gas that may be obtained from wheat, oats, barley, rye, and rice straws, and from corn-stalks, corn-cobs, and other vegetable matter usually burned as waste. If the results of these tests warrant further investigation, the experiments will be extended to the problem of plant equipment for producing the gas on a scale sufficient to allow a farmer to supply light and heat for his house, power for stationary engines, and possibly for his tractor, from a small individual outfit. Several valuable bye-products are obtained in the manufacture of the gas. There is the carbon residue, which is suitable for manufacturing lampblack of exceptionally fine quality, and which contains certain amounts of potash, phosphates, and nitrogenous compounds which give it fertilizing value; and there are also the tar and ammoniacal liquids. It is pointed out that, while it has been possible to operate an automobile with straw gas, and it is known that 5 lbs. of straw will produce about 300 c.ft. of gas, the problem of reducing the gas to liquid form or condensing it sufficiently to allow it to be carried conveniently is an essential one that must be solved before straw gas can be considered as a possible motor fuel.

The opening meeting of the new session of the Scottish Junior Gas Association (Eastern District) is fixed for next Saturday afternoon, Oct. 9, in the Heriot Watt College, Edinburgh, when Mr. C. B. Tully will give an address on the subject of "Carburetted Hydrogen Plant."

Under the combined auspices of the Bradford Education Committee and the Bradford Mechanics' Institute, Mr. G. Percy Bailey, M.A., on Monday commenced a series of six Oxford University Extension Lectures at Bradford, on "Problems of Heating and Lighting." The lectures are experimentally illustrated.

A "Sheffield Number" of "A Thousand-and-One Uses for Gas" deals in an excellent manner with heat treatment methods in the metal industry, by an article by Mr. Ralph Halkett (the General Manager of the Sheffield Gas Company) showing how manufacturing costs in Sheffield are being reduced. A selection of photographs of actual installations of gas-furnaces for different purposes adds to the value of a pamphlet which should be very helpful in increasing industrial gas consumption.

FINANCIAL CONSIDERATIONS IN CHARGING FOR HEAT UNITS.

By "Engineer."

The able and well-considered contribution appearing in the "Journal" of Sept. 29, by Mr. Ibbs, is welcome to all who have given any thought to the matter of the financial adjustments necessitated by the operation of the Gas Regulation Act.

Mr. Ibbs raises two very salient points—viz., the variations in the fraction of a penny charged for the therm, and the variation to be allowed in declared calorific value. He points out that in a short time, when the Board of Trade have dealt with a number of applications, we shall be in a better position to judge the complications which may arise, and better able to point the way out. With regard to the graduations in the charge per therm, Mr. Ibbs makes a good case for advancement by 0·2 of a penny—pointing out that this is equal to the old penny per 1000 c.ft. for gas at 500 B.Th.U. or thereabouts, which is nearer the pre-war quality than the 400 B.Th.U. On the other hand, our old standards are going; and as the calculation only holds good for 500 gas exactly, it becomes a question of the future handling of accounts. We may rule-out second decimal places; for no one should attempt to keep to the equivalent of an exact charge per 1000 c.ft. It is unnecessary. The fight seems to be, therefore, between farthing advances and fifths of a penny. The public would probably favour the farthing as being more easily comprehended; on the other hand, the fifth gives closer working, and greater flexibility. Time will show whether one or both will survive.

With regard to the increments of thermal value, it does not seem reasonable to confine the quality to four or five values between 400 and 600, as Mr. Ibbs seems to suggest. This would immediately shackle some undertakings before they are able to realize any of the benefits of the Act. At the same time, Mr. Ibbs is rightly afraid of what might happen if any multiple of 5 be permitted. Multiples of 10 might be a desirable compromise. But then we must abandon 425, 475, 525, and so on; and the 475 basis is one which many undertakings favour. On the other hand, if the Board of Trade indicate that 10 is the increment, such undertakings must decide between 470 and 480.

In dealing with slots, Mr. Ibbs wisely draws our attention to points we may have overlooked; and it appears to be very difficult to avoid rebates. But this is nothing new. Many of the smaller undertakings, as well as the large, have had this bogey in the past. Further, Mr. Ibbs seems to be looking for a way to reconcile the charge under the new system with that under the old. This is manifestly impossible; and the same applies to his calculations under the sliding-scale. The writer had the pleasure of submitting a series of three articles in the "Journal" for September, October, and December of 1919, in the first of which the essence of the Gas Regulation Act was forecasted with tolerable accuracy, inasmuch as it coupled the change-over in the method of charging with the increased costs due to post-war conditions. Later in this article the operation of the clause will be examined fully; but the writer wishes again to emphasize his previous suggestion—to think in therms.

The writer ventures to think that, in his calculations for slots and for sliding-scale increments, Mr. Ibbs is making the fundamental error of trying to get the horse to carry two jockeys. The horse in question, being a highly-bred animal, used to the extreme accuracy of figures and accountancy, refuses to go.

Mr. Ibbs is correct in taking objection to the double handling of cubic feet and therms. Therefore why handle the former any longer than is necessary. The manufacturing staff, the distributors of gas, the meter-readers and collectors, and finally the rental clerks, must of necessity bear this double burden, and think in therms—having regard to their relation to cubic feet, but why carry the burden any further? Let us drop the obsolete standard when we have no further use for it; and this occurs when the rental is made up.

It must always be remembered that our old standard price, extra for slots, dividend, and sliding-scale were really on a thermal basis for most undertakings—the measured quantity being no more than a vehicle for calculation, and a convenient one for all purposes. But having been used in this manner it is not inviolate, since it only represented a measure of value given to the consumer. The extra dividend was allowed because more thermal units were given to the customer for the same money; and this principle is unaltered. It must not be forgotten that the therm is not only a unit in the abstract, but a real measure of the value of the product delivered; and the law now says that all calculations are to have reference to this value. So here is an additional reason why we need not attempt to reconcile the old with the new.

The extra 10d. for slots, and the 2s. 6d. increment for dividend were granted on account of extra value given, and on the basis of the quality of gas supplied under one's Act; and, once this is converted to the new basis, we can let the cubic feet take care of themselves.

Mr. Ibbs appears to require an adjustment of the slide dividend as the quality supplied changes. But surely this is not necessary, because the value of the penny per thousand adjustment is in itself higher when the grade of gas is increased. If we stick to therms, we cannot go wrong.

There may, however, be an instance where an old increment of 2s. 6d. may become 2s. 4½d. (or its equivalent) under the new basis; and these smaller differences cannot be eliminated. Since all the old standards are in the melting-pot, and the fabric of the system emerges in a new garb, with an approximation to pre-war dividends, one cannot imagine a shareholder grumbling because the slide increment (a two-edged sword, don't forget) represents 2s. 4½d., instead of the former half-crown.

Many of the arithmetical and accounting difficulties will probably disappear when one comes to grips with one's actual case; and the added difficulties arising from a change in declared calorific value will reduce the number of such changes. It will be a much greater problem to come to a decision on the calorific value supplied by any undertaking having regard to the works at its disposal, the system of mains and services, and adequately to gauge the financial advantages of altered methods of carbonization when new plant is under consideration.

In order to clear up some of the points raised in this article, let us consider the following typical case:

Standard price company. Price, 3s. 8d. Dividend, 5 p.ct.
Pre-war selling price, 2s. 10d. Increment, 2s. 6d.

Extra for slots	10d. per 1000
Pre-war dividend	6¼ p.ct.
Pre-war calorific	500 B.Th.U.
Pre-war cost of gas, allowing for residuals	2s. 2d.
Present ,, ,, ,, ,, ,, ,,	4s. 0½d.
Present calorific value	475 B.Th.U.

Assuming that no adjustments are necessary, or alternatively that the above costs are after any required adjustments, we have all the data necessary to frame the scheme:

Pre-war standard price	= 8 8d. per therm.
Pre-war cost of gas	= 5·2d. ,,
Post-war ,, ,,	= 10·21d. ,,
(4s. 0½d. divided by 4·75)	
Increased cost per therm.	= 5·01d. per therm.
New standard price	= 8·8 + 5·01 = 13·81d. per therm.

This may be settled by the Board of Trade (assuming the figures are accepted) at 13¾d., 13·8 pence, or 14 pence. In giving such a decision, we shall see whether the farthing or the fifth of a penny graduation is favoured. Assume a new standard of 13·8 pence per therm. Extra for slots = 10d. per thousand = 2d. per therm. It may be claimed that an extra sum must in future be provided for the depreciation of the slot-meters, stoves, and fittings. The writer would urge responsible officers to consider this point when making applications under the Act; for, although the articles in question have been purchased at pre-war prices, yet they will have to be renewed at post-war prices, and a corresponding depreciation provided for. This will not, however, affect the principle of the calculation; only the figures arrived at.

Let us assume that we have proved a case for 2·4 pence per therm extra for slots, new standard price for slots = 16·2d. per therm. With regard to the sliding-scale, half-a-crown per penny per thousand is equal to half-a-crown per 0·2 pence per therm, and *is independent of the calorific power supplied.*

We have now to see what selling price we anticipate for gas under the Act. Assuming we are content

With pre-war profit	= 8d. per 1000 c.ft. = 1·6d. per therm.
New selling price	= cost price + profit = 10·2d. + 1·6d. = 11·8d. per therm.
Standard price	= 13·8d. per therm.
Difference	= 2·0 pence = 10 increments of 0·2 pence.
New dividend	= £5 p.ct. + 10 times 2s. 6d. = 6¼ p.ct., as in pre-war days.

If this undertaking also had a 3½ p.ct. stock, with an increment of 1s. 9d. in pre-war days, the dividend would have been £3 10s. + 17s. 6d. = £4 7s. 6d. p.ct. The post-war dividend under the Act would be exactly the same figure; so that neither class of stock will suffer by comparison.

In order to complete this example, we can compare the cost on the cubic-feet basis and work-out the setting for the slots. The selling-price for ordinary consumers is 11·8d. per therm, and suppose a calorific value of 470 is declared. This works out at 55·46 pence per 1000 c.ft.

Setting price for slots	= 14·2d. per therm.
	= 66·74d. per 1000 c.ft.
	= 14·98 c.ft. for a penny.

So that 15 c.ft. would be the setting point.

The following table shows the effect of an increment in each direction, as well as the effect of 20 B.Th.U. above and below the declared calorific value.

Declared Calorific Value.	450 B.Th.U.			470 B.Th.U.			490 B.Th.U.		
Price per therm	d. 14·0	d. 14·2	d. 14·4	d. 14·0	d. 14·2	d. 14 4	d. 14·0	d. 14·2	d. 14·4
Theoretical cubic feet per penny	15·86	15 64	15·42	15·19	14·98	14·77	14·57	14·37	14·17
Setting feet per penny	15	15	15	15	15	14	14	14	14
Theoretical price pence per 1000 c.ft.	63·00	63·90	64·80	65·80	66·74	67·68	68·60	69·51	70·56
Setting price, ditto	66·67	66·67	66·67	66 67	66 67	71·43	71·43	71·43	71·43
Theoretical rebate	3·67	2·77	1·87	0·87	*0·07	6·15	2·83	1·85	0·87

* Denotes excess.

From this table it will be seen that the complications are no worse than any which occur under the present system.

Referring to the example given, it is clearly shown that the

sliding-scale basis, once fixed, is not adjustable; and therefore the table given by Mr. Ibbs of the adjustments of slide dividend is unnecessary, and if adopted would introduce a complication we should live to dread the thought of. If any adjustment is needed in the slide increment, it is at the moment of conversion. For instance, in the example treated the increment of 2s. 6d. corresponded with 0·2d. per therm on the cost, owing to the pre-war quality of gas being assumed as 500. If we had assumed 525, the value of 0·2 pence per therm would be equivalent to 1·05 pence per 1000 c.ft. So that to truly convert the increment, we should need to make it

$$1{\cdot}05 \times 2s.\ 6d. = 2s.\ 7\tfrac{1}{2}d.$$

Similarly, if 475 had been the pre-war calorific value, the theoretical converted increment would be

$$0{\cdot}95 \times 2s.\ 6d. = 2s.\ 4\tfrac{1}{2}d.$$

In considering the conversion, however, it must be remembered that 2s. 6d., or rather the original 5s., was quite an arbitrary figure; and there is no real reason why it should be slavishly followed. Having regard to the fact that most gas in pre-war days was between 490 and 530 B.Th.U., the average would be well met by taking 2s. 6d. as the fixed increment of dividend for a rise or fall in price of 0·2 pence per therm.

If the Board of Trade decide that the variation in therm price should be by farthings, then the increment should be increased to three shillings. By the wording of the Act they have the power to do this.

In order to regularize applications to the Board, and to bring before their notice the points raised by Mr. Ibbs and further developed in this contribution, the writer would suggest a small deputation from the National Gas Council to the department dealing with the applications, with a view to a more complete understanding of the machinery with which it is intended to operate the Act.

ELECTRICITY SUPPLY MEMORANDA.

A GREAT deal of attention is again being paid in the electrical technical world to the question of distribution and house voltages. The matter is pressing itself with strong insistence. It is the almost general opinion that direct current supply will have to go, and that alternating current will become the universal fashion. Current will have to be distributed at higher pressures, and then transformed down for domestic supply to from 50 to 100 volts. Whether the transformers should be house ones or street ones is a point over which there may be some division of opinion. On this point, the "Electrical Review" states in a nutshell the case against house transformers. The initial cost would be enormous, the waste of energy serious, and the risk of accident due to carrying 3000 or 5000 volts into a private house, despite all precautions, a grave objection. On the other hand, an increased number of street transformers would involve the minimum disturbance of distributors, would retain the transformers under the control of the supply authority, and owing to the shortness of the distributors would minimize the need for increasing their cross section. So much for that point. Mr. C. H. Wordingham is the revivalist of this distribution question, as was seen in last week's "Memoranda." He has stated his views in a long article in the "Review," in which he knits together the considerations that have moved his judgment in this direction. The Electricity Commissioners may be highly successful in securing a cheap and abundant supply of high-pressure energy for authorized distributors in the untransformed state; but this will not much help the domestic consumer if the distribution costs are high, the cost of the installations in his house heavy, and the restrictions on the use of the supply vexatious. He questions whether many station engineers would welcome applications to-day from "all" their consumers for 3 or 4 KW. cooking ranges. He is dubious whether they could supply them from the existing distributors; and there is also doubt permeating the point as to whether it would pay them to lay the additional distributors necessary with the pressures now in use. The fact is that up to now distribution networks in domestic areas have been planned for lighting and nothing else. If a supply for all purposes is to be both cheap and abundant, mains carrying much more power are imperative. With pressures even of 240 volts, the cost is so heavy as to run up considerably the price to the consumers.

Distribution and House Pressures.

Shock and Alternating Current.

Mr. Wordingham states his case for lower pressures on consumers' premises quite fearlessly and frankly. It is idle to deny, in view of past experience, that while, for all normal individuals, 220-volt direct current is perfectly safe, alternating current of the same pressure can cause, and in a number of cases has caused, death. What, asks Mr. Wordingham, would be the feelings of an engineer who deliberately introduced the dangerous pressure into a nursery, and had a dead child brought to him as a victim of his wilful misrepresentation? The picture is not a nice one. But the fact remains that there has been a large amount of misrepresentation by electrical engineers as to the safety of electricity, and well they know it. The question of shock has of late become of vastly increased importance, because the opinion is now firmly held that, whatever be the inherent advantages of direct current, and they are undeniably great, this form of current must go for general supply, because cheap generation involves transmission over long distances and the use of alternating current. It will be entirely by alternating current that the greatly extended use of electricity to which all electrical men are looking forward will have to be realized. Mr. Wordingham comes to the point that substantially higher pressures than 240 volts must be employed, if a large density of demand is to be met. Then no doubt large premises will have their own transformers; while the general practice will be to group several houses together, and in cases a whole street. With such a scheme, it would be easy to use a pressure of only 100 volts, or even 50 volts, on a consumer's own wiring. In this way, Mr. Wordingham says, all danger of shock would be eliminated; and it would be quite possible to simplify and cheapen the wiring very greatly.

Wiring Rules could be Revised.

Then there could, our friend points out, be cheapening of house wiring, the whole safety of which would however depend on the transformation not failing. However, Mr. Wordingham is Chairman of the Wiring Rules Committee of the Institution of Electrical Engineers; and he thinks that the rules in future should recognize more than one grade of wiring, rising from that which is just safe, and the plainest of the plain, to that which is the best and the most elaborate that money can buy. There must also in the rules be discrimination between installations for different pressures. Of course, no one can deny that the risks of failure of insulation are greatly reduced with lower pressure, and that in consequence the rules could be safely relaxed where lower pressure is in use. We get an attractive picture of economy in house wiring. With a 50-volt alternating current a very poor dielectric on the fixed wiring will suffice; trailing conductors of flimsy character for portable appliances will give satisfactory service; nothing need be earthed, as no shock is to be apprehended; switches and fuses can be of the simplest character, since arcing is lifeless, and all parts can be safely handled alive; incidentally, incandescent lamps are more robust, efficient, and longer-lived. The elements in all heating and cooking appliances are very much more substantial, and their insulation can be secured with much less care. There may be objections, but Mr. Wordingham wipes them out in free and easy style. There may, for example, be objection raised on the ground that heavier conductors will be required for the lower pressure, and especially for the supply of radiators.

Where Lower Pressures are Unsuitable.

But it will be understood that for large houses, high-class shops, offices, and important buildings, the course proposed is absolutely unsuitable. For large blocks of demand, the highest pressure practicable should be used with corresponding precautions. Lighting and small appliances will be best supplied at 240 volts. But—mark this!—large appliances such as cooking ranges are a terrible nuisance to the supply authorities, and costly in mains. Appliances of this kind should have self-contained transformers which would take a distribution pressure of 2500 volts, and transform down to (say) 10 volts on the heating elements, which would then be so massive that their durability would be greater, while all risk of shock to the user would be completely eliminated. Mr. Wordingham asserts that there is no reason why 2000 or 3000 volts should not be perfectly safely carried on cables in hotels and similar buildings. He thinks, too, that a less cumbrous method than pipe-conduit protection for wiring might be devised, and he also asks why wiring should be concealed. He thinks some way should be found of making it so attractive that it can be used on the surface. The concluding words of the long but interesting article are: "In the writer's judgment, we shall see a return to the high distribution pressure, accompanying the practical elimination from new schemes of direct current distribution, and this high pressure will once more be transformed to the very low pressure that is suitable for the house." Mr. Beauchamp (of the Electrical Development Association) and others have publicly blessed Mr. Wordingham for his bold and timely article.

Electrically Heated Water for the Artizan.

The electrical papers have been publishing articles describing what the Jackson Electric Stove Company have been doing in the way of development work since passing from war to peace operations. In the midst of the information, we come across a statement that 200 artizan dwellings in the North are being fitted each with a Jackson electric-cooker, wash-boiler, and two electric fires—the "Review" says "on a commercial basis in competition with gas and coal." We should like to know where this is, so that a few inquiries could be made as to what the "Review" actually means. By the use of these appliances, it is stated, a saving of £30 is effected in the structural cost of each building. "Thus," remarks our benevolent old, short-sighted friend, "the blessings of electrical methods are at last being brought within the reach of every class of user." The £30 happens to be the saving in the structural value of houses that are being constructed for gas equipment. As to the "blessings,"

the artizan occupiers will later on doubtless have something forcible and to the point to say regarding the price of such blessings. The "Electrical Times" gives particulars of the electric wash-boiler. It would seem this is something it is preferable should not be independent in its functions. We get a humorous suggestion that by connecting the wash-boiler to the back of an ordinary fire-boiler where this is available, it is only necessary to use electric heating for "topping-up" the water. But this, it is naively explained, is not essential. For better-class houses, it is explained, there is a very "ingenious" bath-water heater. This consists of a cylinder with water connections, always full of water. The heater is of immersion type, consisting of a hollow rod running through the lid and carrying radially on a boss at the end, like the blades of a fan, half-a-dozen heating elements. When current is switched-on, the water in the cylinder (which is always full) is heated; and by turning on the cold inlet the hot water is forced into the bath, mixed with the cold. Starting from cold, the heater will put 15 to 18 gallons at 110° Fahr. into the bath in about half-an-hour. The full load is 6 kw. This means that starting with water at 50° Fahr., the (say) 18 gallons would have to be raised in temperature 60°; and, without even a shadow of loss, this would require 10,800 B.Th.U. Three units of electricity have only a potential heating value of 10,260 B.Th.U. So that it is more likely the user will have to be content with 15 gallons, which would require, starting at 50° Fahr., 9000 B.Th.U., which would allow a little loss out of the heating value of the 3 kw. The 3 kw. may cost from 6d. to 9d. per bath, which will not, in comparison with other methods of obtaining hot baths, be accounted a cheap "blessing." By the way, we notice that the "Electrician" admits that so far there has not been much progress made with the "all-electric home in connection with housing schemes."

Hiring-Out Radiators.

Electrical journalists have great faith in the public. In the coming heating season, untold numbers of householders are going to laugh at the initial costs of electric heating appliances, installations, and running, and are going in for them freely. We have not yet found that householders as a rule have taken leave of their senses. Only the other day one electrical writer was speaking about the public taking a greater account of economy, and showing a decided reluctance to pay more for a certain service than there is any need to, if they can get it rendered at a less price by a superior method as is the case when one comes to compare gas heating with electric heating. The hiring-out fever has already set in. Powers to hire-out, but not to sell, were incorporated in the Electricity Supply Act of last session. The electrical people are beginning to appreciate what this means. Our friend of the "Electrical Times," who deals-out "Cooking and Heating Notes," tells us that, in districts where a hiring-out scheme is the rule, it "has happened" that six radiators have been fixed to every one sold. There is no need to question the truth of the statement. However, in view of the serious cost of wiring, he looks hopefully to hiring-out relieving the situation for electric radiators. But the retarding forces in these hiring-out schemes will be the cost of electric heating energy *plus* the quarterly rent. On the side of the undertaking, there is the very heavy cost of borrowed money, which will not buy one-half what it would do previously, and so hiring-out rates will have to be at a level that will embrace all outgoings, as the money received per kw.-hour will not do so. It is hoped by the same authority that the time will come when hiring charges will be part of the unit charge, so as to have the whole matter inclusive. The electrical people are looking hopefully to hiring-out to help them to supplement the day winter load.

Analyses of Municipal Gas Accounts for 1918-19.—Acknowledgment has to be made of the receipt of a copy of the "Gas World" Analyses of Municipal Gas Accounts for 1918-19, which are published at No. 8, Bouverie Street, E.C., at the price of 21s. net. The statistics, which relate to seventy-one undertakings, are set out in two linen-backed tables, folded and bound in a cloth case. These analyses are already well known; and all that need be said about the latest issue is that, like its predecessors, it furnishes much useful information for comparative purposes on a variety of matters connected with the financial position and the working operations of the gas undertakings with whose accounts it deals.

New Manufacturing Plant for Chicago.—Progress is being made with the huge new gas-making plant for the People's Gas Company of Chicago, which is being built by the Koppers Company of Pittsburgh, under a leasing agreement with the People's Gas Company, at a cost of $18,000,000. It has been officially estimated that economies rendered possible by the new works will add $1,250,000 per annum to the net income of the Gas Company. Until delays occurred in the delivery of material, 1400 men were at work on the job. It was originally intended that the water-gas plant should be in use at the beginning of next year; but the delays will probably prevent completion before March. The coal-gas plant is expected to be ready by next September. The water-gas plant will have a capacity of 20 million c.ft. per day; while the coal-gas plant (including 100 coke-ovens) will produce about 12½ million c.ft. of gas a day. When the plants referred to are completed, they will add practically 33 p.ct. to the productive capacity of the People's Gas Company.

COOKERY AND FOOD EXHIBITION.

After a lapse of seven years, the exhibition of the Cookery and Food Association has just been held again at the Royal Horticultural Hall, Westminster. With memories of similar exhibitions before the war, it is possible to say that this year's show was in no way below the high standard attained by its immediate predecessors. Some exhibitions appeal to one section of the community, and others to another section; but food and cookery are of interest to all. The attendance was highly satisfactory, and the interest taken in the various competitions, &c., was keen; so that one may safely assume the realization of the intention of the promoters that the exhibition should be of real educational value to the community at large.

There were both navy and army cookery competitions; and one section was devoted to school children's efforts in cookery. In the main hall had been arranged a model kitchen and dining-room, equipped with a No. 3 Richmond "Bungalow" gas-cooker, raised from the ground on a stand, a Fletcher-Russell hot plate, and a Parkinson water-heater. Here, "economy family meals" were cooked and served daily. The material was bought from local tradesmen, prepared and cooked in the kitchen, and served in the dining-room adjoining. The meals were breakfast, lunch, tea, and dinner or supper; and the cost was worked out on as economical a scale as possible. At the time the writer inspected the kitchen, there were upon the table particulars of a luncheon for twelve persons, prepared by the Gas Light and Coke Company's Advisory Staff; the total cost of the food being 11s., and of the gas 5d., which meant an outlay of 11½d. per head. Of course, the arrangement of the kitchen was such that visitors were able to see how all the cooking was done; and ample opportunity was afforded them of asking questions. Other competition work was done on double Main cookers.

Of appliances for use in the kitchen, there were a number on view—some for gas and others utilizing electric current. The Gas Light and Coke Company, as usual at these exhibitions, made a good display with a model kitchen, wherein were one of John Wright and Co.'s latest cookers, a Wilson fire, a Potterton boiler set, a Davis incinerator, and a Richmond wash-boiler. On the table in the centre was a Keith gas iron, connected with the two-light pendant fitting by a flexible tube, and an excellent form of adaptor made by the Gas Light and Coke Company. The adaptor is attached by means of a tee to the down-pipe of the pendant above the ball-joint, and consists of an arm which can be lowered and raised when in or out of use. The pendant is thus left free for movement as desired.

Other exhibitors of gas appliances were the Carron Company, Revy, Phillips, and Co. (toasters and hot-water apparatus for hotels and restaurants), and the Stimex Gas-Stove Company (hygienic gas-range, with open fire for airing and warming).

Low-Cost Mainlaying under Water.

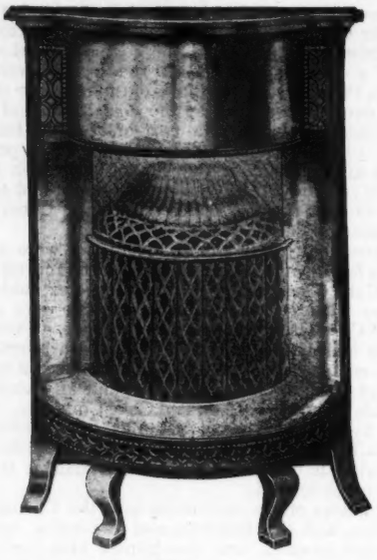
Details of a number of under-water gas-main laying operations were given by Mr. D. L. Hill, of the Toronto Consumers' Gas Company, in a paper read before the Canadian Gas Association; and he concluded his recital by drawing attention to an effective method at low cost which was employed by Mr. C. H. Gow, of Boston, in laying a small cast-iron main across a shallow stream used for boating, which was about 75 ft. wide. The stream was only 5 ft. deep when the pipe was laid; but the same method might be used for greater depths. The crossing was close to, and parallel with, a highway bridge, from which all the work was done. The pipe was laid on spruce piles driven in bents of two from the bridge. They had to be cut accurately as to grade; and as the cutting had to be done under more than 5 ft. of water, a light riveted steel cylinder 6 ft. in diameter and 10 ft. in length was lowered over each bent of two piles until it rested on the bottom vertically. To seal the bottom edge, sand and gravel were deposited around the outside; and by means of a pulsometer the water was removed from the interior of the cylinder. The piles were then cut and capped with the desired timber, and the cylinder drawn up. When this was completed, the pipe was connected and lowered into place from the bridge. Another unique example of simple but effective means of trenching a river bottom for pipe-laying was in connection with a 12-in. water-main under the River Otonabe. The current is very swift at the point of crossing; and the pipe had to be embedded fairly deep in the river bottom, not only on account of the rapid flow, but also because of the logs coming down every spring. Booms were first slung across the stream, and an ordinary rooter plough used, with handles extended to reach the surface. Block and tackle were then fastened to the plough and anchored at shore; and a team of horses was used to do the pulling. In this way the trench was ploughed, and scraped out with a road scraper to the required depth. Of course, this would work quite well with flexible joints; but more care would have to be exercised were rigid joints used.

The annual general meeting of the Yorkshire Junior Gas Association will be held on Saturday, Oct. 16, in the lecture room of the Fuel Department of the Leeds University. Mr. Hamilton Davies, B.Sc., Chief Chemist to Messrs. Wilsons and Mathiesons, has promised to lecture on "Silent Aerated Flames." The seventeenth annual report of the Council states that the members of the Association now number 136.

RICHMOND'S 1920 GAS-FIRES.

A visit to the Richmond Gas Stove and Meter Company's Showrooms in Queen Victoria Street bears witness to the fact that their designing department has well occupied the time since their works reverted to peace-time conditions. In the two years which have elapsed since they were able to resume their normal activities, they have produced a considerable number of additions to their list of gas-consuming appliances for cooking, heating, and water heating. Some of the gas-fires we are able to describe in this article.

It is not at all surprising that the first fire to which attention is drawn is the "Westminster." Its distinctive style of construction is at once apparent. The Richmond Company introduced this type of gas-fire in 1915 [Patent No. 4770 of 1915], calling the stove by the initials "R.H.D.", which stood for "Radiant Heat Distributor." The success which has attended this fire during the past four years has been so pronounced that the Company have now decided to construct an entire series of "R.H.D." fires in varying designs. The original "R.H.D." fire is now called the



RICHMOND'S "WESTMINSTER" GAS-FIRE. ("R.H.D." Series.)

"St. James; and its first successor, as illustrated, is known as the "Westminster." It is claimed for these fires that the area of the distribution of heat is greater than that of any other type of fire. Heat rays travel straight from, and in a direction mainly normal to, the surface of a radiating body. Therefore, while the radiant heat from the usual type of flat-fronted fire has a limited sphere of operation, the semicircular front of the "R.H.D." series must greatly increase the area of distribution of the thermal energy emitted from the fire.

Coupled with this greater distribution of radiant heat, and as a direct consequence of the principle of construction adopted, the heat loss from the cast-iron back of the fire is diminished. The last few years of gas-fire design have witnessed continuous decreases in convected heat and flue heat, and now by this new principle the loss through the cast-iron back is minimized. Automatically an increment, although perhaps not an equal increment, has been secured in radiant energy. It will be clear that the semi-circular type of fire-front gives, for the same number of radiants, a reduced area of back brick compared with the flat-fronted fire. A saving of over one-third of the heat hitherto lost through the back is achieved.

The second illustration is of one other of the new designs introduced this season—the "Empire." A glance at this finely proportioned fire warrants the statement that the high standard achieved in the "Period" series has been thoroughly well maintained, if not excelled. This fire is equally suitable for placing in an open tiled recess or against a tiled slab. It has all the features which have made the "Period" series so popular—viz., high canopy, combined with the ledge principle, which renders it completely proof against the stringent "Lancet" test; nickel-plated fender, which reflects the cheerful glow of the fire; while the removable burner, bricks, &c., enable the maintenance to be quickly and inexpensively achieved. It may be added that all the wearing parts—burner, fuel, bricks, &c.—in the whole of the "Period" series (comprising eight fires, each in 12 in., 14 in., 16 in., and 18 in. fire widths) are interchangeable fire with fire.

When examining these beautifully designed fires, particularly in the special finishes such as armour bright, it is difficult to realize the great advance which has taken place in gas-fire design and construction in a comparatively few years. It would, we are sure, be instructive if comparison was made with the gas-heating stoves with which we were all familiar hardly more than a decade ago. Great progress has indeed been made whether regarded from the point of view of hygiene, economy, efficiency, or, perhaps especially, of design. No one can question that a great deal of the credit for the wider use of gas-fires which has been accomplished is due to the designing departments of makers like the Richmond Company, in that they have provided gas-fires for the industry which can confidently be recommended for use in the most

THE "EMPIRE" GAS-FIRE. ("Period" Series.)

artistically furnished apartment. The modern gas-fire has certainly more than its utility to commend it. Such designs as the two we illustrate will give character to, and enhance the appearance of, the most carefully designed fire place or mantel, which is often the centre of attraction in the architect's design of a room.

PERMEABILITY OF RUBBER TO GASES.

Among the "Notes" recently issued by the United States Bureau of Standards is one ("Scientific Paper, No. 387") dealing with this question. It is abstracted by Messrs. J. D. Edwards and S. F. Pickering for the "Journal of the Franklin Institute."

It is pointed out that certain of the factors which determine the permeability of rubber to gases have been investigated, and the relative rates of penetration of a number of gases determined. The principal findings are summarized as follows:

1. The permeability of rubber compounds varies with the composition, as would be expected. The agency of rubber films is accompanied by a decrease in permeability. A similar decrease may be effected by over-vulcanization. The rubber which shows a very low permeability is, for these reasons, usually very much deteriorated, and frequently brittle; so that it is a disadvantage from the standpoint of gas-lighters.

2. The permeability to any gas is found to be directly proportional to its partial pressure, provided the total pressure is constant. The variation of permeability with total pressure depends on the thickness of the rubber, the way it is supported, &c.

3. The permeability to hydrogen is inversely proportional to the thickness of the rubber. No other gas was tested in this respect.

4. The specific permeability to hydrogen at 25° C. of vulcanized rubber similar to the grade known as dental dam is about 20×10^{-6} c.cs. per minute. This value varies somewhat with the age and chemical characteristics of the rubber.

5. The temperature coefficient of permeability is quite high. For example, in the tests at 100° C., the permeability to carbon dioxide or helium was about seventeen times the rate at 0° C.; and the permeability to hydrogen was about twenty-two times as great at 100° as at 0° C.

6. The relative permeability of rubber to some common gases is shown in the following summary:

Gas.	Relative Permeability. Hydrogen = 1.
Nitrogen	0·16
Air	0·22
Argon	0·26
Oxygen	0·45
Helium	0·65
Hydrogen	1·00
Carbon dioxide	2·90
Ammonia	8·00
Methyl chloride	18·50
Ethyl chloride	200·00

7. The permeability of rubber to water vapour is high—approximately fifty times the permeability to hydrogen. The value, not having been determined with any precision, is not included in the above table.

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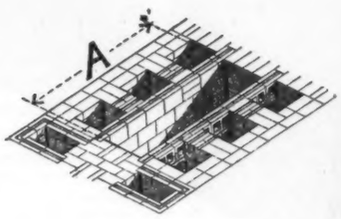

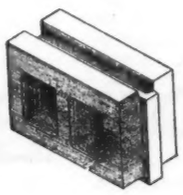

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MUNICIPAL ENGINEERS AT THE BECKTON WORKS.

Discussing the Claims of Gas.

It was an excellent idea to have a meeting of the Institution of Municipal and County Engineers at the Beckton works of the Gas Light and Coke Company; and the same excellence characterized the whole of the arrangements which were made for the occasion. The reward was complete success from every point of view. Last Friday was the day fixed for the meeting; and quite early in the morning members of the Institution began to arrive to take part in a programme on which business and pleasure both found place. Evening had come ere the last batch left the works—impressed, as one and all had been, by the warm welcome of the Gas Light and Coke Company no less than by the magnitude of the operations carried on at their works. The President of the Institution (Mr. James Thomson) had come all the way from Dundee to take the chair for the first time at this meeting; and he made it quite clear that he did not in any way regret his long journey. Many others among the large attendance of members had also come from a distance, knowing that it would be worth while. It may be mentioned that the Chairman of the Metropolitan District Section of the Institution is Mr. G. W. Humphreys, Chief Engineer to the London County Council; the Hon. District Secretary being Mr. E. F. Spurrell, and the Secretary of the Institution Mr. J. W. Dudley Robinson.

The business was transacted in the old rifle range building, which had been transformed into a first-rate meeting-place. Here, at the outset, Mr. Thomas Goulden (the Company's Chief Engineer) extended a brief welcome to the Institution, and expressed the regret of Mr. D. Milne Watson (the Governor) that he was unable to be present. Arrangements that Mr. Milne Watson had had to make some time before, and the crisis that was now being passed through, had, however, prevented this. Mr. Milne Watson had asked him to welcome the members, and to express his deep sense of the honour that had been done to the Company by their presence at Beckton. It was hoped that they would have a very successful meeting.

Gas in Relation to the Housing Problem.

The chair was then taken by Mr. Thomson, who called upon Mr. F. W. Goodenough to read a paper on "Gas in Relation to the Housing Problem."

Mr. Goodenough, after expressing his gratification at being afforded the opportunity of placing his views before the members of the Institution, proceeded to state clearly and convincingly the case for gas in connection with the housing schemes which are now being formulated or proceeded with in all parts of the country at the present time; while on the walls were displayed plans showing the application of "Gas Economy Flues," and the methods of installing gas apparatus in dwellings. There were distributed, too, copies of the interim report of the Committee on Smoke and Noxious Vapours Abatement. As appendixes to the paper were printed the conclusions and recommendations of the Committee, and the general observations by Dr. Samuel Rideal on the results of his well-known inquiry into the alleged hygienic superiority of electric over gas light. The opening paragraphs of the paper were as follows.

Two Urgent Problems.

There are two urgent outstanding problems before the nation to-day—the provision of adequate and suitable housing accommodation, and the preservation (from birth onward) of human life, of which the supply has been so terribly diminished by the ravages of war. The way in which we deal with the one problem has a very real bearing upon the measure of our success in dealing with the other.

Municipal engineers have already done great work for the community in the way of hygiene. In the supply of pure water we have led and taught the world; so that we have practically abolished in our communal life the water-borne diseases, of which typhoid and dysentery are the most important. Our municipal authorities have been pioneers also in communal drainage; we being the first nation wise enough to keep our water supply free from contamination by sewage. Again, the removal and disposal of household refuse is conducted on lines in advance of almost every other country.

In all these and in other directions our municipal engineers have shown their belief in the adage that "prevention is better than cure." But there is one direction in which nothing has been done in most towns and cities, and nothing adequate in any, to safeguard the health of the community from the action of the individual. We no longer allow our citizens to throw their refuse out into the streets; but we have done little or nothing to prevent their throwing refuse up their chimneys, thereby polluting the atmosphere, destroying by degrees our ancient buildings, stunting and depreciating the greenstuffs so essential to health, and cutting off that precious sunlight which is the greatest germ destroyer and the greatest vitalizing power in the world.

We have yet to do all we can to prevent (we find it very difficult indeed to cure) what Dr. Saleeby has well designated the "diseases of darkness"—the diseases which flourish where sunlight penetrates not. The tuberculosis whose germs die in less than ten minutes in the rays of the sun, but retain their deadly vitality for months in the dark; the other diseases of the respiratory organs—croup, bronchitis, pneumonia; the rickets, to which is given abroad the name of the "English disease." These, we are told, are among the worst of the many diseases of which darkness is the friend and light the enemy. What an alteration there would be in our urban death rate were there never what Evelyn called a "hellish and dismal cloud of sea-coal," and Ruskin called "the plague-cloud," between us and the great source of energy which we call the Sun, and others worship as their god!

It is because the authorities they represent have the immediate opportunity—in dealing with schemes for the provision of hundreds of thousands of homes in the near future—of taking a great step towards the prevention of further atmospheric pollution and of setting a great example, that I welcome this opportunity of putting before the members of the Institution of Municipal and County Engineers the case for making provision for the use of gas for cooking, water-heating, and warming, as well as for lighting, in all homes for the working classes erected under municipal housing schemes, while these homes are in process of construction, and not leaving the piping and installation work to be planned and carried out subsequently as an after-thought. It is, of course, not merely upon the grounds of smoke-prevention that the case for gas rests, as I will endeavour to make clear, and as I am sure the members of my audience are well aware. But I am confident that to members of the Institution I am addressing, and to the authorities they represent, considerations affecting the health of the community will appeal with special force.

The case for gas in connection with the housing problem rests both upon powerful considerations of a general—that is, of a communal and national—character, and upon equally compelling considerations of a particular, or individual, character. Fortunately, perhaps, in advocating the use of smokeless fuel, we do not have to ask our citizens to be altruistic; we are able to appeal to their own personal interests and to those of their neighbours.

Housing Scheme Requirements.

To put the case in summary form, it is urged that, from the communal and national standpoints, those responsible for housing and town-planning schemes have to pay regard—

(1) To the health of the community, as affected not only by the prevention of smoke nuisance, but by the reduction of dirt and drudgery in the home, by the provision of proper heating and ventilation in the home, and by the existence of facilities for convenience and improved cooking.
(2) To the demand for, and the duty to provide the working classes with, facilities for enjoying a higher standard of living.
(3) To the need for economy in the use of the nation's coal resources and the realization of the store of chemical wealth they contain; and last, but by no means least—
(4) To economy in building construction.

From the individual or consumer's standpoints, the authorities, in deciding upon the details of house design and equipment, have to pay regard—

(1) To the work entailed upon the housewife—both in regard to quantity and character—according to the arrangements made for cooking, warming, and washing.
(2) To the convenience, comfort, and health of the household, as thereby affected.
(3) To the cost to the consumer thereby entailed.

I hope to show you conclusively that, considered from all these standpoints—national, communal, and individual alike—the case for the use of gas for lighting and for fuel, in preference to crude coal or electricity, is very strong. The case for its use as fuel is, indeed, irresistible, except where constant and prolonged heating is required. In that case the argument against is solely on the question of cost; and for constant heating it is hoped that householders will learn, and be encouraged, to use coke instead of crude coal to a very large extent, and so help to make the towns and cities of the future almost, if not entirely, smokeless. Of course, where the saving in dirt and labour and the increase in convenience and comfort can be regarded as a sufficient offset to the cost of constant heating by gas, the case for its use to the exclusion of solid fuel is complete. But that is rarely, if ever, so in the artizan's home.

Mr. Goodenough then proceeded to deal with his subject under the headings of lighting, relative hygiene of illuminants, relative lighting costs, the fuel question, cooking, question of fuel costs, gas-fires, gas-fire flues, hot-water supply, gas-heated coppers, coal and coal-products conservation, and the public health.

An Important Consideration for Housing Authorities.

As to the choice of gas or electricity for housing schemes, Mr. Goodenough said there is a very important consideration to be borne in mind by housing authorities. It is this: The tenants must have gas supplies available for all fuel purposes—certainly for cooking, and probably for water heating, clothes washing, and warming. Electricity cannot compete with gas for these purposes in such houses. I have never yet met an electrical engineer who claimed that it could. "It may some day, when current is cheaper and appliances are less costly and more reliable"—this is what we are always being told. The householder "never is, but always to be, blest" with electricity as a heating agent. Well, you may take it as beyond dispute that for the artizan's home at any rate—and you can carry it much further than that—gas is the only alternative to coal or coke. That being so, is it not unsound

economically (to use no stronger expression) to spend money—whether that of the community direct or of undertakings which have to obtain from the community a return upon their expenditure—in laying both gas mains and services and electric mains and services upon housing estates, in order that the tenants may have a choice of gas or electricity for lighting as well as the gas they must have for cooking and other heat-consuming domestic processes?

It is perfectly certain—I am quite sure that no electrical engineer will contend to the contrary—that the revenue to be obtained from the supply of electric light at normal prices to an estate of working-class houses or tenements will not, in addition to meeting the works' generating costs, pay interest and sinking fund on the cost of the mains, services, and wiring, provide for their repair, and bear a fair share of overhead charges. Moreover, the reduction in revenue obtained by the gas undertaking through being deprived of the lighting load necessarily increases the costs of supplying gas for fuel purposes, and so increases the cost of gas to the consumer.

Considered in another way, it may be said that the total sum which the great bulk of the tenants are willing and able to pay for lighting, heating, and cooking, is not sufficient to provide a profit for two undertakings on their duplicated capital expenditure; and they must therefore either supply at a loss, to the detriment of other consumers, or charge prices above the normal, to the detriment of the consumers concerned. The laying of duplicate mains and services is consequently economically unsound, however regarded.

This is a practical consideration that ought seriously to be taken into account by every housing authority, whether the municipality is or is not the owner of either the gas or the electricity undertaking, or of both. No one recognizes more clearly than I do that there is a very big field for electric light. But that field does not include the great majority of the houses covered by municipal housing schemes of to-day; and failure to recognize and act upon this fact is certain to cost the community dearly.

COST TO THE USER.

On the question of cost to the user, it may be said that, to compete in cost with gas as a fuel *for equal work done for the consumer*, electricity must be supplied at a price per unit not greater than 1 p.ct. of the price of gas per 1000 c.ft. That is to say, if gas is supplied at 2s. 6d. per 1000 c.ft., electricity must be supplied at 30 ÷ 100 = 0·3d. per unit to give equal cost for equal work. If gas be 5s., electricity must not exceed 0·6d. Putting it into terms of the pending new basis of charge for gas, electricity, to compete as a fuel, must be supplied at a price per unit not more than 5 p.ct. of the price of gas per therm (= 100,000 B.Th.U.). That is to say, electricity at ½d. per unit would be as costly, for fuel purposes, as gas at 10d. per therm.

In conclusion, Mr. Goodenough appealed to the municipal engineers, who have already done so much to make our towns and cities habitable and healthy, to do their utmost to secure that the towns and cities of the future shall be still more habitable and still more healthy, by reason of their not being deprived unnecessarily of any hour of the sunshine of which we in these islands have, through natural causes, none too generous a share at the best of times.

DISCUSSION.

Mr. W. R. DAVIDGE, speaking as a Ministry of Health Housing Commissioner, said he wished first of all to express his appreciation of Mr. Goodenough's contribution to the solution of an important problem, and also of the enterprise of the Gas Light and Coke Company and the British Commercial Gas Association in organizing this meeting. During the past year or two, he personally had heard a good deal about gas and electricity. Officially, the great difficulty with the London Housing Board had been to decide between the relative merits of entirely gas houses and gas *plus* electricity houses. He thought that only in one or two cases had the authorities proposed to dispense with gas altogether; the demand for the gas-cooker was practically universal. It was the price of the actual supply of the gas and electricity which very largely influenced his department at any rate in deciding upon the merits of each. They drew up an approximate balance-sheet in every case; and in this connection, it should be remembered that electricity possessed certain advantages in relation to the internal decorations, &c., of the houses. Could Mr. Goodenough indicate roughly the extra cost of whitewashing, painting, and so on, in the gas house over the electricity house? Though the installation of gas might be cheaper, there would be extra expenses involved subsequently in the matter of decoration. Another thing he would like to know was why the gas companies generally had departed from the pre-war practice of putting in installations entirely free of cost. There were still gas companies in the London area who were willing to do this; but there were others—and this particular Company was one of them—who would not do it entirely free. No doubt there were good reasons to advance from the gas companies' point of view; and it would be well if Mr. Goodenough would put them very clearly before the meeting. Most of the electricity undertakings had been willing to contribute at any rate a proportion of the cost of wiring the houses. One could quite understand the gas companies' attitude where it involved extending a main perhaps half a mile or so; but in a crowded area, where mains were already more or less existent, at least to the borders of the estate, the case was different. However, he must express his appreciation of the very businesslike ways of the gas companies throughout the London area. They had all representatives who would make a success of any business. The real point was the personal preference of the housewives; and they would demand some form of gas cooking. But the personal preference in regard to lighting was quite another matter. Though he was in favour of a large proportion of gas, he did not agree with an entirely gas house. He did not believe in handing the whole thing over body and soul to the gas company. There should in any case be one flue for an ordinary coal-fire.

Mr. GOODENOUGH pointed out that it was not suggested to do away with this. It was intended to have one coal or coke fire.

Mr. DAVIDGE remarked that the Ministry would be quite prepared to accept houses very largely on the "all-gas" principle. He proposed a hearty vote of thanks to the author for his paper.

Mr. NORMAN SCORGIE (Borough Engineer of Hackney), who seconded the proposition, said they could all of them agree on the desirability of decreasing to a minimum the smoke nuisance which undoubtedly existed in most areas to-day. So far as lighting was concerned, he thought electricity at present prices was cheaper than gas; and he quoted some figures to show this. If, however, they had to put in gas for cooking and heating, it did seem it was hardly to be expected that they should lay down cables just for the lighting alone; and he did not think there was an electrical engineer who would say, if he had only got the lighting, that the customer was an advantageous one to him. The Electrical Engineer at Hackney always declared that he did not care at all for lighting. It was the least profitable of all his supplies, because the whole of the demand came on at one time for a few hours. As to interior decorations being affected by gas, his own experience of the Housing Authorities was that there was mighty little decoration in the houses they were prepared to sanction. [Laughter.] Therefore from this point of view it was immaterial whether gas or electric light was used. At any rate, the Boards with whom he had had to deal were prepared to agree to one coal-fire, and the remainder could be gas. The gas companies, no doubt, were very businesslike in the arrangements they were desirous of making to facilitate the use of gas in connection with these houses; but there was one point that might be worth consideration. It would be found that the gas company would put in the whole of the piping at a certain figure, including a gas-cooker and water-heater; but all these would belong to the gas company, which in the event of a tenant desiring electricity might create a difficulty. It was true that the gas companies were not now putting in installations free; but he had had a reason given him for this. It seemed that they were only permitted to charge for automatic supplies the sum of 10d. per 1000 c.ft. over the ordinary meter rate. When gas was at something like 2s. 6d. per 1000 c.ft., this 10d. represented 33⅓ p.ct., and fairly covered the cost; but now, when costs had gone up about 200 p.ct., 10d. was not a sufficient sum, and therefore they must have a contribution from the owners. This was the arrangement he had been able to make.

Mr. F. WILKINSON (Willesden) said that in his case the lighting was to be by electricity. He had just had to build a house for himself; and in this he had put gas-fires in every room except one, and had provided a gas-circulator. By treating coal at gas-works, there was a great saving in transport, handling, and stacking of it. The ordinary householder had to stack his coal, and thereby lost a tremendous amount of calorific value. Another thing to be borne in mind was the loss to the nation by the dissipation of valuable bye-products when coal was used in its raw state or for generating electricity.

Mr. H. H. CREASEY, of the British Commercial Gas Association, as one of the originators of the new gas-fire flue, then explained to the meeting a number of diagrams which were displayed on the walls illustrating the application of this flue to offices and dwellings. He took the opportunity of quoting the following extracts from remarks made by Sir Charles T. Ruthen, F.R.I.B.A. (Deputy-Controller of Accommodation, H.M. Office of Works), in the course of the discussion upon a paper which Mr. Creasey read some months ago before the Society of Architects: "I calculate that if a system of gas-fires was to be installed in (say) one-third of the houses needed to-day, you would save, I believe, 750 million bricks. I calculate also that you would save at least six days per house on bricklayers; so you would save in the 250,000 houses a million-and-a-half days of bricklayers. The saving is colossal. . . . Of course, the saving in the cost of cottages is very important, especially to-day, when you come to consider that even at £30 per cottage you would be saving approximately one house in every thirty, with the present cost of cottages at £900. They may be more to-morrow. That is a consideration; and when one wants three-quarters-of-a-million houses, the saving of one house in thirty would be a very large number. That is a big point; but I think the biggest point of all is that the system is sound. There is no question it is sound. . . . By your gas-fire, you maintain a satisfactory flue in every room. You save enormously in the brickwork; and that is of the greatest advantage to-day, when the bricklaying craft is so short of hands."

Mr. E. WILLIS (Chiswick) said he was in agreement with those who claimed that electricity possessed many advantages over gas for lighting; but he thought up to the present gas was really pre-eminently the best for heating. He would suggest one alteration which would very much assist in regard to economy. This was, in the case of heaters having a thermostat, that instead of only cutting the consumption down to one-quarter (perhaps 15 c.ft.) when the thermostat came into action, they should make the reduction to about 3 c.ft. Of course, the difficulty was to ensure that the gas remained alight; but there should be some means of doing this, the same as with the burner bye-pass. No doubt, the use of electricity resulted in a substantial saving in regard to decorations.

Mr. P. HARRISON (Chelmsford) said it was a pity the author had not mentioned the effect upon decorations of using gas, because he could easily have made this one little concession to electricity, having so many good points in favour of gas. He would like to know whether, when slot-meters were installed, the whole cost might be put down to the housing scheme. In a scheme which he had in progress in his town, of over a thousand houses, they had decided entirely upon gas, both in the roads and in the houses. He would like to believe that his Committee had been guided by the advantages drawn attention to in the paper; but he was rather inclined to think they were influenced by the fact that recently they acquired the gas undertaking, whereas electricity was still in the hands of a private company. But it did seem to him, from the point of view of economy, that there was a great deal in the contention that to lay down both pipes and cables was

hardly likely to prove good for either undertaking. The idea in his case was to charge the whole of the cost of fitting-up for gas to the housing scheme; but the question had arisen whether this would be quite in order, inasmuch as it was proposed to instal slot-meters. He was a little doubtful on the subject.

Mr. LAWSON (Deptford) said that in connection with a scheme which he had under consideration, they had gone into this matter very carefully. Fortunately, they were in a district where the gas company offered to put lighting in, provided that they allowed them to fix in each house a slot-meter. As 8-ft. ceilings had been arranged for, the pendant had to be only 1 ft. 9 in. from the ceiling; and this would greatly affect the decorative work that would have to be done. There was no question as to the comparative advantage of gas for cooking; but he was a little doubtful personally about the lighting.

The PRESIDENT (Mr. James Thomson, City Engineer of Dundee) said that where he came from they had tried both gas and electricity; and, with the caution characteristic of the Scot, they were not satisfied yet. They were to build specimen houses, one all electric, and the other all gas. They had already tried hot-water circulation, which he believed was the first scheme in the country. It had been completed; and it was a distinct success. He did not, however, recommend the installation of a hot-water circulating system in connection with any housing scheme that was not provided with a communal laundry, because the cost would be prohibitive. The number of new houses was 250; but they were erecting a communal laundry to serve not only these 250 houses, but all the old houses in the neighbourhood as well. They had hot-water circulation to all the houses; and each tenant had available water at something over 190° every hour of every day. They charged 2s. 6d. a week experimentally; but he thought this figure was too low. The tenant saved from 3s. 6d. to 4s. a week in coal. There was a gas-cooker in every house; and the water was used for heating, as well as for satisfying domestic requirements. The cost of this was £22,000; and on comparing it with what would have been expended in brickwork and the equipment of fire-places, he found they lost a little, but so little that it was not worth while speaking about it. There were many advantages. He thought they had convinced the Scottish Board of Health that what they were doing was a distinct step forward; and he hoped they would be able to adopt it for all their schemes where communal laundries were provided.

Mr. GOODENOUGH, in reply, said the gas industry did not suggest for the working man an entirely gas house, because they did not believe he could afford to use gas for the fire that was alight all day. Coal or coke—and preferably coke—was what they suggested for the living-room fire. The question had been raised as to the comparative repair costs entailed for working-class houses where gas and electricity was used. He quite agreed there was a difference in favour of electricity; but what it amounted to in pounds, shillings, and pence, he frankly could not tell them. He did not, however, think that the difference could be a very serious one; and it had to be remembered that in such houses and tenements frequent whitewashing was desirable from the hygienic point of view, quite apart from the question of decoration. Further, if they were to obtain the cleaner atmosphere in their towns that they could secure by the use of smokeless fuel generally, there would be very much less damage done to ceilings from the use of gas. In a country house ceilings would last considerably longer where gas was used than they did in the towns, because the air was cleaner. It was the dirt in the air that caused the trouble. As to the choice of gas or electricity, where the electrical undertaking was owned by the municipality, and the gas supply by a company, as in the case of London, there seemed to be an idea on the part of the municipality that they must always go to their own shop for as much as they could persuade the community to use, and if business was handed to the gas company they were giving something away. But it should be borne in mind that gas consumers were as much partners in every gas undertaking working under the sliding-scale as the consumers could possibly be in the electricity undertaking—which was usually a burden upon the rates. With regard to the departure from the pre-war practice in the matter of free installations, it was quite correct that the sum levied per 1000 c.ft. above the current price of gas which undertakings were empowered to charge was limited to 10d., which used just to cover interest and amortization charges on capital, and the upkeep of the pipes, fittings, meter, and stove put in for the prepayment consumer. When it was realized that the cost of installation had gone up from £6 to £20, while the 10d. remained constant, it would be seen that the gas companies, who were under no statutory obligation at all to instal prepayment meters, could not do so on the same basis as before. In figures Mr. Scorgie had given, there was an error, the rectifying of which turned the advantage over to gas; so that electricity, even at the low price charged in Hackney, was higher in cost than gas at present rates. It seemed to him (the speaker) that at any rate the southern parts of the British Isles were not suitable, as was Dundee, for central heating. What was needed was a system of heating that could be put instantly into operation and as quickly put out of action; and they all knew the cheerful aspect of an open fire. As to the whole cost of slot-meter installations being met by housing schemes, if the slot-meters were to be set to charge the consumer a higher price than the current price (as was the usual practice), he did not think it could be considered a fair charge upon the housing scheme to put down to it the whole cost of the installation. It should be a part cost.

LUNCHEON.

There were still a few minutes to spare before adjourning, and these were occupied by Mr. Goulden in briefly explaining, by the aid of the black-board, the process of gas manufacture, so that the visitors might the better understand what they were to see after on. They then sat down, as the guests of the Gas Light and Coke Company, to luncheon, with Mr. Goulden in the chair. After the Loyal Toast,

Mr. GOULDEN expressed the great pleasure it had given to the officials of the Company, and not least to himself, to be present at this gathering. Meetings such as they were having that day could be productive only of benefit to all concerned. It was only by meetings of this kind and the free discussion of important subjects that the bulk of those connected with any industry were enabled to keep abreast of the times and to become acquainted at first hand with the best methods of the particular profession they followed. The matters with which the members of the Institution had to deal were many in number. The housing question was only one of numerous complex problems before them for solution, which arose out of the extraordinarily varied needs of the present day, because of the aggregation of large numbers of people in restricted areas. These problems threw great responsibility upon those connected with the administration of affairs. The gas industry themselves took a pride in administering to the comfort, the welfare, and the health of the community, which it was the business of the Institution of Municipal Engineers to consider. From the health point of view, there was the diminution of the smoke nuisance arising from the extended use of gas and electricity. There was room for both. In some directions gas was pre-eminent; and in other cases, with regard to lighting, &c., there was a great diversity of opinion, and it was very much a matter of convenience which was chosen. For cooking and heating, gas had a very strong case; and he was glad to hear some of the speakers that day bear witness to the thorough-paced way in which gas people did their work. One point which he had not heard touched upon seemed to him to be very important. This was the effect of smoke upon trees in a big city. What was prejudicial to tree life was prejudicial to human life as well. Then there was the question of coal conservation. Every coal-fire took something from the community which it should have. Each ton of coal burnt in a raw state represented a loss to the community of something like ¼ cwt. of valuable fertilizing material in the form of sulphate of ammonia. There was also the loss of all the products from (say) 10 gallons of tar, which in itself was a very serious matter. Again, they were consuming more coal than they should do, using it in its raw state; and at the same time that they were getting a decreased production of coal, they were still further reducing, by their waste of this coal, the amount available for export to maintain the financial position of the country. They claimed as gas people that they were almost one branch of the Institution of Municipal Engineers; and therefore they could the better understand the responsibility which attached to the work of the members. He asked them to drink to "The Institution of Municipal and County Engineers," and coupled with the toast the name of the President, Mr. Thomson.

Mr. THOMSON, in response, acknowledged the kind hospitality that had been extended to the Institution, and said he would return to Dundee with pleasant recollections of their meeting at Beckton.

Mr. SCORGIE proposed "The Gas Light and Coke Company," and coupled with the toast the name of Mr. Goodenough, who he said was already known to most of those present.

Mr. GOODENOUGH, in reply, expressed the hope that this would not be the last visit of the Institution to the works of the Company.

THE WORKS.

The members were then taken by rail to the piers, under the guidance of Mr. Goulden, who, in the absence of Mr. W. B. Leech (the Engineer at Beckton), was supported by Mr. J. S. Thorman (the Deputy-Engineer of the works) and four assistants. Coal brought by colliers of from 1000 to 4500 tons capacity is unloaded at a T-shaped pier extending some 400 ft. into the river. The coal-unloading plant consists of twelve hydraulic cranes operating 1-ton grabs, capable of lifting, at 750 lbs. per sq. in. pressure, 50 to 60 tons per hour to a maximum height of 117 ft., including 17 ft. by luffing jib. Some 700 tons of coal can be unloaded per hour; and the quantity unloaded per annum is about 1,300,000 tons. Hydraulic power is provided by five compound steam-engines, two 125 H.P. and three 200 H.P., pumping 320 gallons per minute each. Another pier is used for loading residuals. Coal is delivered to the retort-houses and coal-stores by means of locomotives and specially constructed wagons on an elevated railroad, some 20 ft. above the ground.

From there, they went to No. 12 retort-house, which contains 440 retorts of 24 in. by 18 in. section, 20 ft. long. Coal is discharged from wagons on the elevated railroad into breakers supplying elevators and conveying plant delivering into coal-hoppers placed over the charging machines throughout the length of the retort-house. The charging machines of the Fiddes-Aldridge pattern receive coal from overhead hoppers into a chain fitted with feathering blades which, while pushing the coke out of the retort, leave the charge of coal when the chain is withdrawn. The weight of coal per charge is about 10 cwt.; and the time allowed for carbonizing about eight hours. In a house of this description, some 650 tons of coal can be carbonized daily, producing over 6 million c.ft. of gas. There are fourteen retort-houses altogether; and the coal-gas making plant is equal to an output of about 60 million c.ft. per day.

There was then a visit to the carburetted water-gas plant, which has a producing capacity of some 20 million c.ft. of gas per day. This plant has been recently remodelled; and each set is fitted with twin generators and single carburettors and superheaters. All operations are controlled by hydraulic power, worked by levers from a central stand.

At the conclusion of the inspection, the visitors found tea awaiting them, over which some time was spent talking over all that had been seen and heard.

The autumn meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers has been arranged to take place on Thursday, Oct. 21, at Newport (Mon.). The business of the meeting will consist of the Presidential Address of Mr. J. H. Canning, and a paper in which Mr. J. Robb will give particulars of the cost of mains, services, and piping of houses in Hardwicke Village, Chepstow. In the afternoon the members will inspect the Crindau works of the Newport Gas Company.

SWISS SOCIETY OF THE GAS AND WATER INDUSTRY.

The Competition of Water-Generated Electricity.

At a recent meeting of the Society at Glarus, M. Zollikofer passed in review the conditions which confront the Swiss gas industry in the near future. He dwelt upon the difficulties that had to be faced as the result of the great reduction in the consumption of gas which had taken place in consequence of the prohibitive price and self-enforced rationing during a large part of the war period. Conditions in the Swiss gas industry reached a crisis in 1916. Production had attained a figure of 189 million cb.m. in that year, against 66 millions in 1900. It had fallen to 127 millions in 1918, and to 120 millions in 1919. The task now before the industry was to increase production, or rather demand; and for this purpose it was necessary to combat the widespread belief that the various substitute fuels which had been resorted to during the war were more economical than gas for cooking. He cited figures showing how greatly the relative costs to the consumers of fuels yielding the same number of heat units had altered since the pre-war period. Gas, which formerly stood fourth on the list as regards economy, was now first in point of heating efficiency. This shifting of values required to be brought home to householders and other users of fuel for cooking purposes.

The question of the competition of electricity with gas for cooking was examined by M. Zollikofer in reference to the claims that the natural resources of Switzerland in water power for the generation of the electric current provide a universal source of heat for this purpose. It is shown, however, that analysis of the national position does not support these claims. The basis of the analysis is the equivalence of 1 cb.m. of gas and 5 kilowatts. The present consumption of gas for cooking purposes is about 100 million cb.m., and will rise to (say) 150 million cb.m. as the result of propaganda in favour of the abandonment of solid fuel. Thus for cooking solely by electricity 500 million kilowatts are needed, and are required chiefly from 11 to 12 o'clock in the forenoon and from 7 to 8 o'clock in the evening, when current is least available owing to the demands for industrial purposes and lighting. Since 2640 million kilowatts were available in 1919, of which, however, only about 30 p.ct. is produced during the five winter months, or about 160 million kilowatts per winter month, while the requirements for cooking are 42 million kilowatts per month, it is seen that the possibility of supply is highly doubtful. The impracticability of the scheme is more strikingly shown by a somewhat different comparison. In 1916 the Swiss gas supply in the hours (morning and evening) of maximum consumption was approximately 34 cb.m. per second, representing power to the amount of 0·80 million horse-power, which is as much as the capacity of the whole water-power installations in Switzerland in 1914. It is thus seen that a national system of cooking by electricity would be limited to the summer months—gas taking the place of the electric current in the winter. The duplication of appliances for these two systems would be an extravagance not worthy of any serious consideration.

Economies in Gas Manufacture.

As in many other industries at the present time M. Zollikofer perceives recovery to depend upon a reduction of prices consequent upon increase of production; and he proceeds to discuss the technical methods which have latterly been investigated in this area by gas engineers. He instances the advantages of the use of steam in continuous vertical retorts as one such measure, and directs special attention to the firing of retorts as a part of the process offering large opportunities for the reduction of cost. The introduction of central producer furnaces delivering a regular supply of constant gaseous fuel, and utilizing low grades of combustible, is a step in this direction. A possible but still problematical means of cost-reduction is carbonization in retorts heated by surplus electric power. M. Zollikofer regards such a scheme for the joint undertaking of gas and electric installations; but he is of opinion that a system of internal heating of the coal charge might perhaps be devised for reducing the cost of carbonization by eliminating heat losses. There is the obstacle, however, that the system could be put into operation only during the eight or ten hours when the electric plant is working largely short of its capacity. The merit of the scheme would lie in the periodical accumulation, in the form of gas, of considerable amounts of electric energy. The question is before the Technical Committee of the Swiss Society as a problem requiring much critical examination.

Possibilities of Cheap Oxygen.

More detailed discussion is given to the process suggested at the recent meeting of the Institution of Gas Engineers by Mr. H. J. Hodsman and Professor J. W. Cobb [see "JOURNAL," June 8, p. 640] for the distillation or complete gasification of coal by partial internal combustion with oxygen and steam. M. Zollikofer abstracts their communication and translates the table [p. 641 of the issue just quoted] analyzing the functioning of this process. He points out its special interest to Swiss gas engineers on account of the possibility in their case of obtaining oxygen at a low cost. Inquiries as to the production of oxygen have provided the basis for the calculations embodied in the following tables, in the compilation of which it has been assumed that the oxygen could be obtained from liquid air. While at the present time the cost of distillation by external furnaces is as much as 15 c. per cb.m. of gas, the cost of complete gasification with oxygen should be only from 1 c. to 1¼ c. and the production of gas very much greater. The comparison of the cost and values of the raw material and the products derived from it [Table V.] is most encouraging.

TABLE I.—*Cost of Production of 1 Cb.M. Oxygen at Various Prices of Electric Energy.*

(1 cb.m. oxygen requires about 1·5 h.p.)

Price of current (centimes per kilowatt).	1	2	3	4	5	6
Consumption of current per cb.m. oxygen = 1·1 kilowatt	1·1	2·2	3·3	4·4	5·5	6·6
Plus standing charges (interest, depreciation, &c.).	6·0	6·0	6·0	6·0	6·0	6·0
Cost of oxygen (centimes per cb.m.)	7·1	8·2	9·3	10·4	11·5	12·6

TABLE II.—*Cost of Oxygen for Production of 1 Cb.M. of Gas (a) with Steam, and (b) by Complete Gasification.*

Price of current (centimes per kilowatt).	1	2	3	4	5	6
(*a*) *Distillation with steam.* 0·107 cb.m. oxygen per cb.m. gas (net cost of current)	0·10	0·20	0·30	0·40	0·50	0·60 centimes per cb.m.
Cost of current, including interest, depreciation, &c.	0·76	0·88	0·99	1·11	1·23	1·35 centimes per cb.m.
(*b*) *Complete gasification.* 0·179 cb.m. oxygen per cb.m. gas (net cost of current)	0·20	0·40	0·60	0·80	1·00	1·20 centimes per cb.m.
Cost of current, including interest, depreciation, &c.	1·27	1·47	1·76	1·86	2·26	2·26 centimes per cb.m.

TABLE III.—*Cost of Steam for Production of 1 Cb.M. of Gas at Various Prices of Electric Energy.*

(In the production of steam in electric boilers an efficiency of 95 p.ct. is assumed.)

Price of current (centimes per kilowatt).	1	2	3	4	5	6
Cost of current per kilo steam	0·80	1·60	2·40	3·20 (3·5)	4·00 (3·5)	4·80 centimes (3·5) with coal
(*a*) *Distillation with steam.* 0·11 kilo steam per cb.m. gas cost	0·08	0·16	0·24	0·32	0·40	0·48 centimes
(*b*) *Complete gasification.* 0·19 kilo steam per cb.m. gas cost	0·15	0·30	0·45	0·60	0·76	0·90 centimes

TABLE IV.—*Cost of Distillation with Steam and of Complete Gasification (with Oxygen) at Various Prices of Electric Energy.*

Price of current (centimes per kilowatt).	1	2	3	4	5	6
(*a*) *Distillation with steam.* Cost per cb.m. of gas .	0·84	1·04	1·23	1·46	1·38	1·70 centimes
(*b*) *Complete gasification* Cost per cb.m. of gas .	1·42	1·77	2·12	2·53	2·73	2·93 centimes

NOTE.—The bracketed figures given in columns 4 to 6 of Table III. (of 3·5 centimes per kilo of steam) are based on the cost of raising with coal.

TABLE V.—*Production of Gas by Internal Combustion with Oxygen and Steam (Distillation and Complete Gasification).*

From 100 kilos Dry Coal at 22 frs. are produced:

(*a*) Distillation.		(*b*) Complete Gasification.	
Gas, 54·3 cb.m. of 5064 cals.	26·00 frs.	Gas, 180 cb.m. of 3350 cals.	54·30 frs.
Coke, 59 kilos at 24 frs. .	14·30 ,,	Coke, none	—
Tar, 7·1 kilos at 25 frs. .	1·80 ,,	Tar, 7·1 kilos at 25 frs. .	1·80 ,,
	42·10 frs.		56·10 frs.
Less— Cost of steam, 0·75 kilos at 22 frs. . .	0·15 fr.	*Less*— Cost of steam, 4·27 kilos at 22 frs. . .	0·95 fr.
Value of products . .	41·95 frs.	Value of products . .	55·15 frs.
Excess of value of products over cost . .	19·95 ,, = 89 p.ct.	Excess of value of products over cost . .	23·15 frs. = 102 p.ct.

While M. Zollikofer emphasizes the necessity for an investigation into the commercial utility of the oxygen process he recog-

nizes its special importance to the Swiss gas industry—rating it higher in this respect than electric heating of retort-charges. It is hoped to make trials of it on a working scale.

The concluding portion of the paper reiterates the importance of reviving and extending the use of gas for cooking and other domestic purposes. In advocating this programme, M. Zollikofer is evidently impressed with the energetic measures taken by gas companies in the United States, as was witnessed by him on his tour in that country, and reported in a previous paper, a translation of which has already been published in these columns. ["JOURNAL," Aug. 25, p. 389.]

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit and Meeting at Stretford.

The members of the Manchester and District Junior Gas Association paid a visit to the Stretford Gas-Works on Saturday last; there being about sixty present.

The PRESIDENT (Mr. J. Bridge), in opening the proceedings said that the Engineer and Manager of the Stretford Gas-Works (Mr. H. Kendrick) was so well known to members of the Association that there was no occasion to introduce him.

Mr. KENDRICK said it gave him great pleasure to welcome Mr. Bridge and the members of the Association to the works. He had been looking up, and found that the Association had paid them a visit in 1912. Since that time he had not made many alterations or additions. The chief points of interest, however, were the installation of new stoking machinery, and the putting down of a telpher and track for the handling of the coal from the canal. The plant had been working for two months, and the costs of coal handling much reduced thereby. The purifiers had been enlarged, a benzole plant had been put down, and there had been installed a high-pressure gas supply to the Trafford Park area. They had also abandoned the old method of naphthalene washing, and had adopted the "Colson" process, which had removed the stoppages. No complaints had been received since last March, whereas they had had as many as forty complaints a day. The reinforcement of the telpher was very simple. There were four steel rods forming the columns, and seven in the beams; the rods being bound with ¼ in. wire at 6 in. centres.

The party were conducted round the works by Mr. Kendrick, Mr. Livesey, his Assistant, Mr. Dann, the Chemist, and Mr. Nicholson, the Mains Superintendent. Many very interesting points were observed, including the method of dealing with the oil emulsion or sediment that had accumulated over a long period at the bottom of the oil-tank. This emulsion was seen being passed through a Sharples centrifuge filter having 25,000 revolutions per minute—the oil and water being well separated. The oil was afterwards run to the storage tank for use in the carburetted water-gas plant. Another feature of interest was the oil-spraying of meters with best engine oil, by means of a compressor working at 25 lbs. per square inch.

THE VISITORS AT TEA.

Tea was served in an adjoining hall, under the presidency of Mr. Kendrick. At the conclusion of the repast,

Mr. TEASDALE (Salford) moved a vote of thanks to the Directors, Mr. Kendrick, and his staff. This was the third occasion on which the Association had visited the works; and it showed what a friend they had in the Engineer. He also remarked upon the devotion of Mr. Kendrick to the Manchester Junior Gas Association, and also to the work undertaken by him in the matter of gas-fitters and their examinations; Mr. Kendrick being the examiner in this particular subject.

Mr. DIXON (Lancaster) seconded the vote of thanks.

The PRESIDENT said he should like to support the resolution. This was hardly a usual proceeding for the President to take; but as he had had the honour of serving Mr. Kendrick for ten years, he was sure they would grant him that pleasure. Mr. Kendrick always supported the work of the Association, and had on many occasions given them freely of his helpful services.

Mr. KENDRICK, in returning thanks, said he would gladly convey their vote to his Directors, who were only too pleased to grant these facilities, and were never afraid of criticisms. On Monday, he would have completed 25 years' service. He had always been keen on efficiency; and he was hoping that they would soon be able to reduce the prices that had now to be charged for gas. They were having large increases in their consumption, and therefore hoped that something might be done in the direction of reducing prices before long. The spraying of the meters had been of benefit to them. The meters had registered more correctly, and so far they had not noticed anything of a detrimental character.

Mr. LIVESEY, on behalf of the staff and himself, said it had given them great pleasure to be there that afternoon and explain the various units of their plant. He thanked the members for the interest shown.

INCREASED EFFICIENCY OF DOMESTIC COOKING APPLIANCES—LOW-GRADE GAS AND FLAME CONTACT.

Mr. J. H. DAWE (Oldham) then read his paper on this subject—as printed in the "JOURNAL" last week, p. 669. It gave rise to the following

Discussion.

The PRESIDENT, in opening the discussion, said he was sure the members had, along with himself, listened with considerable pleasure to Mr. Dawe. The author was one of the younger members; and he wished to congratulate him on his first paper—one which possessed several notable features. The paper was the result of practical experience, and it was an example worthy to be followed by others of their younger members who had in times past been deterred from reading a paper, feeling unable to give one which would occupy three or four columns in the technical press and take twenty minutes to half an hour to read. Mr. Dawe had given a lead; and he hoped it would be an inducement for more younger members to take an active part in the work of the Association. It was not his intention to criticize adversely the paper; but it would have been better if the time factor had been given in the tests. The efficient burner might be taking an unduly long time, and be out of proportion to its efficiency. Again, Mr. Dawe mentioned one particular make of burner; but it was quite possible to get as high an efficiency with another type. One thing he noticed in the last series of tests, which he concluded referred to an incandescent burner giving equal illumination in all cases, was that for a reduction only of 12 p.ct. in the B.Th.U. per hour there was unfortunately, so far as the consumer went, an increased consumption of 36 p.ct. Such conditions would undoubtedly increase the annual make of gas; but for efficient working one must consider, along with many other things, how this extra volume of gas was to be distributed. It was not every trunk main that was capable of taking a 36 p.ct. increase. Again, the consumer under the present system of charging for gas had a right to look forward to an appreciable reduction in the price per 1000 c.ft. Low-grade gas, at the present-day cost per 1000 c.ft., to his mind was not going to serve as a successful competitor to electricity. To do this, the cost would have to be very considerably reduced.

Mr. J. ALBINSON (Manchester) said that all burners were of equal efficiency if the gas was completely burned. He thought it was of no use publishing results of the efficiency of burners, because, in reality, all such tests indicated only the efficiency of collection of B.Th.U. developed in the burner. The time factor should be noted in all tests, or the rate of supply of the B.Th.U.

Mr. HAILSTONE (Rochdale), speaking of the time factor, said low-grade gas in the instances given would take one-and-a-half times as long to raise the temperature of the vessel as was taken by high-grade gas. He referred to the Gas Investigation Committee's report on the effect of inerts on low-pressure incandescent burners. He also thought there was a need for standardization of tests to enable comparisons to be made.

Mr. STEWART (Rochdale) made a few remarks referring to the time factor in the use of gas from the consumers' and makers' points of view. He instanced the case of a maker of sugar-boilers in his town who specialized in making burners for these appliances, and incidentally mentioned that they did not care whether they consumed 200 or 400 c.ft. for boiling 56 lbs. of sugar, if the 400 c.ft. boiled the sugar in eight minutes and the 200 c.ft. boiled it in ten minutes. They wanted to boil their sugar in the shortest time possible, no matter what the consumption per hour was.

Messrs. BUCKLEY (Manchester), C. E. TEASDALE (Salford), and W. HILL (Stalybridge) all spoke on the time-factor question.

Mr. DAWE, in reply, said a 600 B.Th.U. gas could not be thoroughly consumed under ordinary town's pressure. If the gas supplied was low-grade and thoroughly consumed (in other words, all the B.Th.U. put into the kettle or pan) even if more gas was used, a gas supplied cheap enough was what was wanted. What was the use of B.Th.U. being wasted up the sides of the kettle, &c.—it was in the kettle that it was wanted, not out of it.

A hearty vote of thanks was accorded to Mr. Dawe for his paper; and the meeting ended.

A Temporary Suspended Gas-Main.—The failure of a bridge over the river at Fond du Lac (Wis.) broke a 10-in. gas-main, and resulted in cutting off the gas supply from some hundreds of consumers. Steps were immediately taken to restore the service by means of a temporary 6-in. main, 175 ft. long, which was suspended from three 10,000 lb. steel telephone cables attached to poles on each bank of the river. After suspending the main, the sag in the entire span of cable amounted to 20 ft. The work was done without the use of a barge or boat; and so complete were the precautions taken to prevent accidents, that no serious trouble or explosions resulted after the service was restored. Following the accident, the cock at each meter was immediately turned off; and when the service was restored, every appliance was tried in the presence of the consumer, who was instructed to notify the company promptly in case of leaks or any other trouble. As a result, only fourteen complaints were received after the gas was turned on.

Wholesale Production of Power Alcohol in India.—It is believed that arrangements now being made for the experimental production of power alcohol on a considerable scale in India will conclusively prove that alcohol for fuel can be produced on a commercial basis and in large quantities in various parts of the Empire. Rice straw will be used in the first place. But other cheap raw materials are available; and it is hoped that within two or three years large supplies will be available to be imported into this country. Side by side with the efforts to promote the production of power alcohol as an alternative motor fuel, steps are being taken to overcome obstacles that would retard its use when available. The Empire Motor Fuels Committee of the Imperial Motor Transport Council have recently appointed small expert committees to deal with the modification of Customs and Excise restrictions in connection with alcohol; experiments to discover the best conditions for developing the alcohol engine and types of alcohol fuels, alone or in mixture, for industrial purposes; and the important subject of denaturation (or rendering alcohol unpotable).

LIGNITE FOR GAS MAKING.

Apparatus for Utilizing High-Moisture Fuels.

Reference has already been made in the "JOURNAL" to an article on the subject of the use of lignite for gas making, by Mr. W. D. Wilcox, the President of the East Idaho Gas Company, which appeared in a recent issue of the "Gas Record." In this, the pre-drying of lignite was suggested, in which case, beyond the provision of the dryer, no change would be required for the use of lignite in existing gas-making apparatus.

Where, however, the construction of new plant is under consideration, says Mr. Wilcox, there is possibly a better method of making gas from lignite. The steam and carbon dioxide drawn-off from the lignite during pre-drying are liabilities. They are detrimentals in the lignite, and liabilities to the extent that their removal involves expense. If they could be put to use, there would be a substantial gain in the efficiency of gas production. He has taken out patents for apparatus for the gasification of high-moisture, high-oxygen fuels (such as lignite, wood, and dried peat), in which the moisture and oxygen are put to use.

Describing his apparatus, Mr. Wilcox says it consists of two connected retort-generators. A retort-generator may be described as a vertical retort superimposed above, and discharging its contents into, a water-gas generator at a rate determined by the consumption of the fuel in the generator. Apparatus of this description exists in the Tully gas plant and in the Strache plant.

DETAILS AND PROCESS.

The retorts are surrounded by flues through which are passed and completely burned the gases issuing from the generator during the blast period. The coal introduced from time to time or continuously into the upper portion of the retort is made to give off its volatiles during its passage downward, in part by the heat passing into the retort from the flues, and in part by the sensible heat imparted to it by the upward passage of the hot water gas given-off in the generator. In the apparatus designed for use with lignite or other high-moisture, high-oxygen fuels, the retorts are surrounded by a common heating chamber (or a system of flues). Closeable openings from the upper part of each of the two generators admit the gases given off during the blast period to this heating chamber, where a secondary combustion takes place. If the blast and run periods in each generator be made of equal length and blasting carried out alternately in one or other, there is a continuous supply of heat to the flues. In the Tully and Strache retorts the heating of the flues is intermittent.

As the gas is withdrawn through the conserved gas-outlets in practically uniform volume and of uniform composition, no relief holder is needed, and the condensing and purifying are carried on with good efficiency. There is no reason apparent why the runs may not be about twice the length of the blows, overlapping and reducing the period of external heating to two-thirds of the total time. The retorts are of somewhat greater height than in the Tully plant and are provided with two outlets. From the upper outlet, near the top of the retort, there is drawn off the steam and carbon dioxide mixed with only a small proportion of combustible gas given off as a result of low-temperature heating. From an intermediate outlet there are withdrawn the combustible gases given off at high temperature, admixed during the run period with the water gas from the generator. The steam and CO_2 continuously generated in each of the retorts are passed alternately into one or other of the generators, taking the place of steam from an independent boiler in the usual production of water gas. Assuming the proper temperature to have been realized by blasting, the moisture and the combined oxygen in the lignite are used as vehicles for the conversion of the fixed carbon into gas, and instead of being liabilities are transformed into assets.

It may be of interest to note at this point that the combined coal and water gas derived from lignite or wood is of a higher calorific value per cubic foot than the combined gas made in Tully plant from bituminous coal. This arises from the greater volume of hydrocarbon gases given off by heat as compared with the quantity of fixed carbon available for the production of water gas after a portion has been consumed in the generation of the heat required to carry on the gas-making process.

There is a less proportion of the lower heat-value water gas in the mixture. The Tully plant, operating on bituminous coal, will turn out a combined gas of 350 to 385 B.Th.U. Using lignite or wood, we may expect a mixture having a value of 400 B.Th.U. or more per cubic foot.

GOOD COMMERCIAL GAS PRODUCED.

Investigations carried out during a recent period, both by the United States Bureau of Standards and by the Research Committee of the British Institution of Gas Engineers, have demonstrated conclusively that such a gas can be burned with excellent results in all forms of gas appliance now in use, and that its value as compared with a richer gas is quite closely in proportion to the values indicated by a calorimeter. It is even suggested that, with a proper adjustment of the appliances, a somewhat higher value per B.Th.U. can be obtained from the lower-value gas. The gas will closely approach the standard "not to exceed 425 B.Th.U." which was lately imposed upon all the gas companies of Great Britain by order of the Board of Trade.

As nearly as can be estimated in advance of an actual operation of the apparatus described, one ton of North Dakota lignite as mined will, under good conditions of operation, produce from 20,000 to 28,000 c.ft. of gas. A ton of Wyoming sub-bituminous coal will produce from 35,000 to 38,000 c.ft.

LABOUR COSTS LESS.

As the material charged at the top of the retort from a hopper passes downward by gravity, and is fully gasified so that only the ash remains to be removed from below the grate of the genator, it is believed that the labour cost per 1000 c.ft. of gas will be much less than in the generally-used type of horizontal coal-gas benches.

In conclusion, Mr. Wilcox declares that while special consideration has been given in the article to lignite and sub-bituminous coal, it may be noted that peat and wood are materials only a step further removed from bituminous coal, and containing increased proportions of moisture and combined oxygen. The procedure employed in the case of lignite is, with slight modification, applicable either to wood or peat.

Guarding against Spontaneous Combustion.

In his Canadian Gas Association paper, Mr. B. B. Saul considered three methods of storing coal, from the point of view of preventing spontaneous combustion. The first method—that of open storage—is on the face of it, he said, the simplest. Yet unless carried out properly it is the most difficult, and the most expensive in the long run. The idea of ventilating a coal-pile is often condemned as unsatisfactory. Ventilation should begin as soon as possible after storing the coal, and not when heating has already commenced. When coal is stored under a shed to a height of (say) 30 ft., the question of ventilation becomes more complicated. Ventilating holes spaced at frequent intervals are not practicable; and iron pipes with holes on the side are unsatisfactory, as the holes easily plug-up. His practice is to keep the coal-piles under "eternal vigilance;" and when localized spots reach near the danger-point, they are immediately removed. The second method—storage of coal either in pockets or bins—is more rational than open storage as far as prevention of spontaneous combustion is concerned; but the expense incidental to it has prevented its application on a large scale. A rather elaborate plan to guard against spontaneous combustion has been adopted by the American Government in Narragansett Bay, where there is about 60,000 tons of storage capacity. The coal bins or pockets contain 4-in. temperature tubes of galvanized iron about 20 ft. long, set in the bin floors, and projecting upwards through the coal-pile. They contain thermostats which record temperatures when above 150° Fahr. The 232 tubes are connected to a general annunciator, which is installed in the superintendent's office, so that in case the temperature of a bin has reached the danger-point, an alarm is sounded, giving the exact location on the indicator. The third method—submerged storage—is the most expensive, though probably the most economical in the long run. The largest plant of this type is at Brunot's Island, Pittsburgh. The pits, built of ferro-concrete, are 800 ft. long, 150 ft. wide, and 25 ft. 6 in. deep, with the sides sloping at an angle of 45°. The full storage capacity of this plant is 100,000 tons. All experiments agree on the effectiveness of submerged storage to obviate spontaneous heating and prevent weathering.

Home Illumination.—Circular No. 55 of the United States Bureau of Standards, which is entitled "Measurements for the Household," contains three chapters relating to light in the home, and the measurement and cost of gas and electricity. It is remarked that, while many important questions remain unsettled, there are certain simple rules regarding which there is general agreement. These include: (1) Do not work with a flickering light. In such a light the eye is constantly called upon to readjust itself, and severe fatigue is the result. (2) Do not use unshaded lamps. (3) Do not judge illumination by looking at the lamp. The lamp is not meant to be seen. It enables you to see other things; and the lamp itself which looks most brilliant may be, for that very reason, the least effective. (4) Do not face the light. (5) Do not put the lamp too close to your work. (6) Use shades and reflectors that both protect the eye from the direct light of the lamp and throw the light where it is needed.

A New Accumulator Inspection Lamp.—There has been placed upon the market by the Hart Accumulator Company, Ltd., of Marshgate Lane, Stratford, E., a very convenient type of unspillable accumulator inspection lamp, which should prove particularly useful to meter-readers and inspectors. It is, in fact, already employed by one of the principal Government Departments for close-range inspection work. The lamp-fitting is designed to hook easily on to a coat button, thus leaving both hands free, while giving a strong steady light in any desired direction. There is a switch on the lamp case which can be used either as a flashing or permanent switch. The battery is capable of giving six-hours' light on one charge; and the plates are contained in a strong celluloid box, fitted with an unspillable device. The whole thing is completed in a workmanlike manner by the enclosing of the battery in a waxed wood case, and firmly clamping-down on to a rubber ring joint, which further ensures freedom from leakage.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Price per Therm—Currency not Fractions.

Sir,—In considering the changed conditions brought about by the new system of selling gas, we have to regard them not only from the point of view of the accountant but also from that of the public. I earnestly urge those responsible for the conduct of gas undertakings to think twice before they abandon the advantage of expressing their prices per therm in terms of coinage currency, for the proposal to use other fractions of a penny. The public can easily understand a charge of (say) 11¼d., 11½d., and 11¾d. per therm—they buy others of their necessaries, such as bread, milk, &c., in this way—but to charge (say) 11⅝d., or 11·4d. would introduce a new terror for the majority. One farthing per unit is equal to 1d. per 1000 c.ft. for 400 B.Th.U. gas, and to 1¼d. per 1000 c.ft. for 600 B.Th.U. gas—figures very little removed from those to which we have been so long accustomed.

Similarly with regard to declarations of calorific value. The difference between 500 B.Th.U. and 510 B.Th.U. is only 2 p.ct.; and as a practical gas maker, I suggest it would be as easy to work to either of these limits in gas production as to an intermediate figure of (say) 504 or 506. But when one comes to convert cubic feet into therms, the advantage of proceeding by tens is at once apparent.

As I have already said, from the accountants' point of view, it does not matter which course is adopted; but in the public interest let us do what we can to avoid too great a use of those "damned dots" which were such a source of anxiety to the late Lord Randolph Churchill.

Charles Carpenter.

South Metropolitan Gas Company,
709, Old Kent Road, S.E., Oct. 2, 1920.

Sir,—I have read with interest Mr. Ibbs's article published in your issue of the 29th ult., but fail to see what advantage is gained by introducing decimal points into the selling price of gas. Multiples of ¼d. are surely the more intelligible to the consumers, and provide, in all circumstances, not so large an equivalent per 1000 c.ft. as to make variations of price inconvenient. Even in pre-war days, with gas at one-half its present figure, it was unusual to vary the selling price by so small a sum as 1d.

In the Beilby report it will be remembered that four standards—viz., 400, 433, 466, and 500 B.Th.U.—were suggested. These appeared to be somewhat excessive margins. It is no less extreme to suggest the possibility of variations from 400 to 600 B.Th.U. by multiples of 5 B.Th.U. Adopting 10 as the multiple, we at once (1) reduce the number of tables required by one-half, (2) avoid the third decimal place in our table for arriving at the exact equivalent of therms, and (3) are able to construct a set of tables for every price and all varieties of gas which for each 40,000 c.ft. and multiple thereof provides absolute accuracy both in therms and amount. Such tables have been prepared by this Company, and a copy for any particular price from 4d. to 1s. 3d. per therm in multiples of ¼d., and for any grade of gas from 440 to 560 B.Th.U. will (upon application) be supplied to any gas company who may require them.

In regard to the amount of the slide for dividends, before abandoning altogether the old method in favour of what appears to us one far preferable—*i.e.*, that the amount to be divided over the standard dividend should be proportionate to the amount gained by the consumers by the reduction of price below the standard price—we made a close examination of the effect on the slide by the new system of selling by heat units. It is apparent that a company selling gas of 400 B.Th.U. with a 2s. 6d. slide for each 1d. per 1000 c.ft., would anticipate a similar slide for each ¼d. per therm; while another company, with gas of 500 B.Th.U., and with the same slide should receive 3s. 1¼d. for each ¼d. per therm. Of course, the standard price of the former should be proportionately lower on the basis of volume, other things being equal; while on the thermal basis the standard price would be the same.

I append a simple table to illustrate my meaning:

Calorific Power.	Standard Price. Volume Basis per 1000 C.Ft.	Standard Price. Thermal Basis per Therm.	Slide for Each 1d. per 1000 C.Ft.	Equivalent Slide per ¼d. Therm.
	s. d.	d.	s. d.	s. d.
600	5 0	10	2 6	3 9
550	4 7	10	2 6	3 5¼
500	4 2	10	2 6	3 1¾
450	3 9	10	2 6	2 9⅔
400	3 4	10	2 6	2 6
350	2 11	10	2 6	2 2¼
300	2 6	10	2 6	1 10½

In the above examples each company is assumed to have the same slide of 2s. 6d. for each 1d. per 1000 c.ft.; and it is seen that the equivalent amount of slide per ¼d. therm varies from 3s. 9d. to 1s. 10½d. The conclusion I arrive at is this: That, in fixing the amount of the slide, no gas company will need to haggle over decimal parts of a penny.

In dealing with the slot-meter collection, no difficulty is anticipated. Collectors will work from a table calculated at the selling price of gas per therm *plus* the price per therm allowed for the hire of fittings, &c.; the surplus in the meters, if these are set at a higher equivalent price per 1000 c.ft., being returnable as hitherto. It must be assumed that the number of B.Th.U. sold would be the same whatever the declared calorific power may be; and if this be so, the company will suffer no loss by any alteration of its standard. In practice, it will probably be found that few changes will take place large enough materially to affect the position.

Frank Day, Accountant,
South Metropolitan Gas Company.

Old Kent Road, S.E., Oct. 4, 1920.

Accountancy under the Gas Regulation Act.

Sir,—The gas industry as a whole is indebted to Mr. H. E. Ibbs for his initial observations on matters pertaining to accountancy under the Gas Regulation Act. They will enable many gas accountants to test their personal proposals, and what is of more importance, assist in the stabilization of gas accounts under the "therm" principle.

The present would be a very suitable opportunity to call District Conferences of Gas Accountants for the purpose of formulating rules consequent upon the new conditions that will shortly become operative. I venture to suggest that for England and Wales, the following places would be convenient:

South	London and Southampton.
South-West	Bristol.
Midlands	Birmingham.
Yorkshire and Lancashire	Leeds and Manchester.
North	Newcastle.
Wales	Cardiff, Bristol, or Liverpool.

Scotland and Ireland would, I feel, be in a much better position to make their respective suggestions.

The special points to consider, other than those raised by Mr. Ibbs, would be: The most convenient form of rental and of meter-reading book or card; questions arising out of the prepayment collection; methods of conversion to thermal units; standardization of statistics; and matters connected with the change of method so far as gas accounting is concerned.

I hope this suggestion will meet with some support—especially as gas accountants have, as compared with gas engineers, so few opportunities of meeting for purposes, in their own sphere, closely identified with the well-being of a progressive industry. In addition, the meeting would tend to a uniformity of method in gas accounting, which undoubtedly would increase the public appreciation of efficiency in the financial administration of gas undertakings.

Provincial.

Oct. 1, 1920.

The "Betrayal" of the Gas Shareholder.

Sir,—I feel further correspondence with your anonymous correspondent would be futile; but if he is a shareholder in this Company, he will be able to voice his grievance at its next general meeting.

Charles Carpenter.

South Metropolitan Gas Company, Oct. 2, 1920.

Sir,—May I be allowed to make a few remarks in reply to that part of the letter from "One of the Betrayed" appearing in your issue of Sept. 29, in so far as it refers to my letter of Sept. 17, which you were good enough to insert in the "Journal."

Does "One of the Betrayed" know that consols at their present price yield £5 9s. p.ct., and first-class corporation, county, and railway permanent stocks 6 p.ct.? South Metropolitan ordinary stock costs to-day a price which yields, on the basis of its last dividend, only £4 13s. This does not look as if the credit of the South Metropolitan Gas Company was so very bad. When the investing public realizes that this is a permanent stock, having an assured 5 p.ct. minimum dividend, with a reasonable possibility of a larger dividend being paid, the stock will be worth round about 80, even with the present price of money; and the new 6 p.ct. minimum guaranteed stock should be worth par.

Naturally, if the South Metropolitan Company have to make a big issue of "Permanent 6 p.ct. Minimum Stock" at the present time, it will have to be at a price below par. It will be a most attractive gilt-edged investment, inasmuch as payment of the 6 p.ct. minimum is insured by the Company's power to charge for gas whatever price may be necessary to yield this dividend, and there is always the possibility of a higher dividend being paid.

Short-dated or permanent securities of industrial companies are not, as your correspondent is likely to find if he holds them long enough, comparable with gilt-edged stocks. I am old enough to have purchased 3 p.ct. Consols at £113, and to have had to buy trustee securities at a price which only yielded £2 16s. p.ct.; and I see nothing unreasonable in anticipating a time when gilt-edged securities may again be on a 4 p.ct. basis, though doubtless this will not be for some years.

Truly, if I am "an optimist of the first water," "One of the Betrayed" is indeed a gloomy pessimist, if he thinks that as far as this generation is concerned, present economic conditions are likely to be permanent.

If your correspondent will take the trouble to inquire, he will find that my views on the subject of co-partnership are held by many of the most able men in the country; and while I should not be so bold as to state—as your correspondent does—"what the real facts are" in relation to co-partnership, I would be bold enough to prophesy that before many years have passed, co-partnership in some form or other will be the rule rather than the exception.

I wonder whether the expression of this gentleman's opinions—which he regards as a statement of facts—would be more or less likely to carry weight if he disclosed his name.

I may perhaps conclude by saying that I am not a shareholder in the South Metropolitan Gas Company, nor have I any interest whatever in the Company.

E. B. Read.

Temple Chambers, E.C., Oct. 1, 1920.

The Claude and Haber Processes.

Sir,—In your issue of Sept. 8 an article appeared under the heading of "The Haber Discoveries in France," in which it is stated: "The French have realized that the Claude process is not altogether satisfactory, and desire to add small technical details as used in the Haber process, so that these might be put into working at a factory shortly to be erected."

I may mention that similar articles have appeared in other portions of the Press, and notably in the "Financier" and the "Board of Trade

Journal," in both of which a reply from my Company has since been inserted.

As my Company are the owners of the British and Colonial patents of the Claude process, I wish to point out that this German statement is altogether erroneous, and is a good illustration of the German methods of trying to condemn a process when they find one invented by their late adversaries which is far superior to their own.

The French owners of the Claude process have not approached the German Badische Company for the right to use any part of the latter's process, and have no intention of doing so. The Claude process is working on a semi-commercial scale in an entirely satisfactory manner, and is securing in three operations what it takes the German Haber process eight operations to achieve.

Evidently this fact has caused considerable anxiety to the Germans; hence their desire to throw cold water on the French process.

A full-sized commercial unit is now being installed in France, and is expected to be in working order before the end of October, when the British Press will be invited to inspect it, and judge for themselves of the great value and simplicity of the Claude as compared with the German Haber process.

Thos. A. Day, *Secretary*,
Cumberland Coal, Power, and Chemicals, Ltd.,
5 and 6, Great Winchester Street, E.C.,
Sept. 29, 1920.

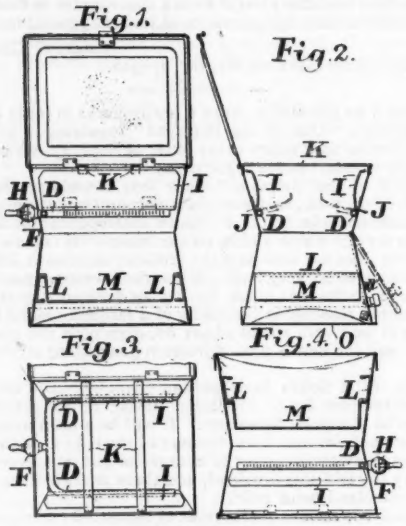
REGISTER OF PATENTS.

Gas-Stoves.—No. 150,380.

Hersey, M. H., and Oliff, F. C., of Victoria Street, S.W.

No. 10,966; May 2, 1919.

This invention relates to gas cooking and heating stoves with a bifurcated burner provided with movable deflectors to deflect the heat downwards or to be raised clear of the gas-jets.



Hersey and Olliff's Gas-Stove.

Fig. 1 is a sectional elevation of the stove, showing the lid open; Fig. 2 is a section of fig. 1. Fig. 3 is a plan of the stove. Fig. 4 (a view similar to fig. 1) shows the lid closed and the stove in the inverted position.

The casing is rectangular, with a constriction at the central portion of its height. The lid is hinged along one side of the upper end of the casing. D are the two limbs of the bifurcated burner extending along two opposite sides near the constriction. The limbs are provided at their inner surfaces with a series of saw cuts forming slots for gas-jets, inclined at 45° to the vertical. Gas and air mixture is applied to the burner through the inlet chamber F, which is furnished with apertures of a size to permit of the entrance of a large volume of air relatively to the volume of gas introduced through the nozzle H, the inner end of which extends into the chamber F beyond the air inlets, so that the mixture of gas and air takes place in the burner tube. I indicates the baffles, of which there are two—one hinged above each of the limbs of the burner as shown at J. The baffles are curved, and may be turned down so as to occupy the position shown in broken lines in fig. 2, so that their inner ends do not meet, but leave a space between them for the upward escape of the products of combustion from the burner; or they may be turned into the position shown in full lines where a practically full area of the casing is provided for the passage of the products of combustion. The position adopted depends upon the use to which the stove is to be put—that is to say, upon the quantity of heat it is desired shall be distributed at any one time.

K are removable bars forming a grid at the upper part of the casing for supporting cooking utensils above the gas-flame, and L are guides furnished in the lower part of the casing to support a tray or shelf M.

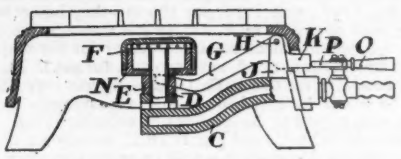
The stove can be used for heating a room and also for boiling and grilling purposes. For ordinary boiling, it is placed as in figs. 1 and 2—the cooking utensil being on the bars K and the baffles I adjusted in position to suit the amount of heat required. For cooking pastry, a convenient course to adopt is to invert the stove as in fig. 4 and place the shelf M in the position shown.

Burners for Gas-Cookers.—No. 139,809.

Albrechtsen, H., and Iversen, S. I., of Copenhagen, Denmark.

No. 6676; March 4, 1920. Convention date, March 4, 1919.

This invention has for object to provide an improved arrangement for allowing the distance between the burner of a gas-cooker and the bottom of the cooking-pot to be varied according to the size of the flame. To accomplish this, a loose burner-tube, which carries the burner-head proper, is slidable telescopically upon a fixed burner-tube, and rests upon the forked end of a bell-crank lever, the other arm of which is adapted to be actuated in such a manner that the loose burner-tube can be raised and lowered so that the total length of the telescopic burner-tube (and thus the position of the burner head with respect to the cooking-pot) may be varied.



Albrechtsen's Gas-Cooker Burner.

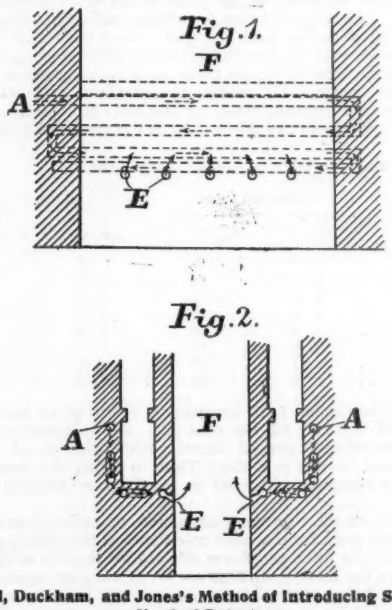
In the body of the cooker is disposed the gas-pipe C, to which is attached at its inner end the burner-tube D. The burner-tube D has fitted on it a tube E shiftable and carrying at its upper end the burner head F. The tube E has a flange N, under which engages the forked end G of a bell-crank lever pivoted on a pin H. The outer end K of the bell-crank is placed under control of an eccentric segment P attached to the gas-valve O in such a manner that the lever, with the burner-tube, will be in its lowermost position when the gas-valve is (as shown) fully opened, and will be raised more and more in proportion to the extent to which the valve is closed. It is obvious therefore that the distance between the flame and the cooking pot will be varied with the adjustment of the size of the flame.

Introducing Steam into Vertical Retorts. No. 150,589.

Woodall, Duckham, and Jones, Ltd., and Duckham, Sir A. M., of Strand, W.C.

No. 31,799; Dec. 18, 1919.

The patentees point out that, as the result of carbonizing coal in a retort heated externally, hot coke is formed through which steam may be passed to produce water-gas, to an extent limited by the endothermic action which occurs in its production and the amount of heat transmitted through the retort walls to the coke. The use of superheated steam has been found to improve results; but the limit to which the steam can be superheated in the ordinary manner is not sufficient to compensate materially for the endothermic action. By superheating at low pressure, however, improved results are obtained. Their invention provides for the introduction of steam superheated above 700° Fahr., into the lower part of a vertical retort or oven (to which alone the invention relates). The superheating is carried out in tubes built-in or about the waste-gas flues, which may be of a temperature of about 1800° to 2200° Fahr. The highly superheated steam is introduced direct from the fire-clay tubes into the retort—"thus conserving all the heat possible."



Woodall, Duckham, and Jones's Method of Introducing Steam into Vertical Retorts.

Vertical sections are shown, in planes at right angles to each other, through the lower part of a retort. The pipes which are built in the wall communicate with each other, so that the steam admitted at A passes through each of them and, having traversed the complete circuit of the nest, escapes through nozzles E into the chamber F.

They claim as their invention: (1) For introducing steam into the

lower part of a vertical retort or oven for carbonizing fuel, two or more pipes inserted in each side wall, through one or more of which steam is passed so as to become superheated, and to return along another or other of the pipes which are perforated to permit the escape of steam into nozzles discharging it into the retort or oven. (2) The construction of the lower part of a vertical retort or oven for carbonization of fuel with pipes for the introduction of steam substantially as described with reference to the drawings.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Sept. 29.]

Nos. 26,747—27,380.

Askham, W.—"Incandescent mantles." No. 26,809.

Bannister, W.—"Anti-vibrators for incandescent gas-lighting." No. 26,952.

Burden, E.—"Apparatus for increasing heating efficiency of flames produced by combustion of gaseous fuel." No. 27,296.

Cole, R. C.—"Gas-fires and heating apparatus." No. 27,282.

Colebrook, W.—"Water-heater." No. 26,991.

Commin, F. J.—"Apparatus for production of cyanogen compounds or cyanides." No. 27,045.

Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz."—"Gas meters." No. 27,275.

Davis, J. E.—"Apparatus for determining calorific values of coal gas, &c." No. 27,157.

Fraser, W.—"Gas cooking-apparatus." No. 26,927.

Hollings, H.—See Davis, J. E. No. 27,157.

Lessing, R.—"Treatment of coal." No. 27,162.

M'Isaac, J.—"Gas and air pressure controllers." No. 27,090.

Martin, W.—"Anti-vibrators for incandescent gas-lighting." No. 26,952.

Pringle, T.—"Gas, &c., stoves." No. 26,794.

South Metropolitan Gas Company.—See Davis. No. 27,157.

Wallace, G. W.—"Apparatus for distilling carbonaceous materials." No. 27,278.

Wallace, G. W.—"Process for carbonizing carbonaceous materials." No. 27,279.

Wilputte, L.—"Coke-ovens." No. 26,789.

MISCELLANEOUS NEWS.

BRITISH GAS LIGHT COMPANY, LIMITED.

The Half-Yearly Meeting of the Company was held on Wednesday last, at the London Offices, No. 11, George Yard, Lombard Street, E.C.—Mr. Henry Woodall in the chair.

The Secretary (Mr. A. W. Brookes) read the notice convening the meeting and the report of the Auditors; also the report referring to the Norwich station. The Directors' report and the statement of accounts were taken as read.

The Chairman said that when six months ago he had the pleasure of addressing the shareholders, he expressed the opinion that the Company had passed through the worst of their trouble, and that the future was brighter. The accounts for the past half year showed that this expectation was justified. The profits for the six months had enabled the Directors to propose the same dividend as last half year, and to increase the carry-forward by over £15,000. They had also made some provision for deferred renewals. But the present cost of all work was so excessive that they could not expect to return to the larger dividends of the past until more leeway had been made up, though they might hope very shortly for some improvement in the return to the shareholders, unless anything unforeseen happened. He would point out that the cost of capital of the whole undertaking was at present less than 5½ p.ct., owing to the large amount of premium capital and the low cost of borrowed money. On the ordinary share capital issue of £570,000, the premiums received on which no return was made amounted to no less than £324,900, or 57 p.ct.

INCREASED GAS SALES.

There had been a satisfactory increase in the sale of gas over the corresponding half year of 7⅞ p.ct., and over the half year to June, 1914 (the last half year before the war), of 9⅜ p.ct. At Hull they had again done very well, having more than earned their parliamentary interest. The profit at Norwich showed an increase of nearly £2000, and that at the Potteries of over £5000. There was an increased profit from the Yarmouth chemical works. Unfortunately, there was a small loss at Trowbridge of £448, and at Holywell a decrease in profit of £250. Trowbridge and Holywell were very small stations, and did not affect seriously the prosperity of the whole undertaking. The Directors hoped, however, that in the near future they would be able to bear their proper burden, and add to the well-being of the whole.

PRICES ALLOWED FOR GAS.

The reason why all the stations had not earned their parliamentary interest was the want of elasticity in the price of gas allowed under the Company's Acts of Parliament. This would shortly be remedied under the Gas Regulation Act, which received the Royal Assent in August last, and to which he would refer later. At Hull the maximum price fixed for gas was 5s. per 1000 c.ft., which allowed a large margin—sufficient to meet even the enormously increased costs. At all the other stations the full maximum price had been charged for more than a year. At the Potteries the maximum allowed was only 3s. 6d. per 1000 c.ft., which was quite inadequate at the present day.

THE ISSUE OF PREFERENCE SHARES.

The proprietors would be aware that early in the year the Board offered for subscription £100,000 of 7 p.ct. cumulative preference shares and £100,000 of 6 p.ct. Norwich mortgage debentures. Practically the whole of the issue of £100,000 preference shares had been allotted. Only 269 shares now remained. This number was so small that it was not worth circularizing the shareholders; but any applications for these shares would be welcome, and treated in the order of their receipt. Of the 6 p.ct. debentures only £29,500 was taken up. Although not entirely satisfactory, they might congratulate themselves on this result, and on the fact that they appealed for capital at the time they did. The late Chairman, Mr. Gardiner (who they were very sorry was unable to be with them that day), strongly urged the advisability of raising capital as early as possible; and the Directors realized the wisdom of his advice. Considerable extensions and renewals were taking place at all the works. The provision of the necessary capital was causing the Directors some anxiety; but they were carefully husbanding their resources, and would limit their expenditure to the smallest extent consonant with efficiency. The Board would shortly have to ask for further capital; and they would doubtless have to rely principally on existing shareholders (who best knew the soundness of the concern) to supply it.

THE GAS REGULATION ACT.

The Gas Regulation Act was a very welcome and necessary one to the industry. It had been promised them by more than one President of the Board of Trade; and under it they were assured they would receive fair treatment. They were satisfied that the promises made would be faithfully kept, as they had been; and they might be sure that the Act would be fairly administered, in which case they might hope to return to the more satisfactory position of the past. The Directors would like to make up to shareholders their losses; but they recognized the impracticability of this. They only hoped that there would be no delay in putting the Act into force, so that they might benefit by it from the earliest possible moment. Gas legislation, he thought, on the whole, had been extraordinarily good and fair. The only difficulty had been that, with few exceptions, there was not sufficient elasticity as to price to meet the enormous increase in wages and cost of materials due to the war. The Gas Regulation Act met the case. It was interesting to know that in New South Wales, in 1912, the Gas Act of that year followed almost word for word our Act; but it gave power to the gas companies in Australia to obtain an inquiry before a Judge of the Supreme Court, and if they could prove that the cost of production and distribution had increased, the Judge was empowered to raise the standard price in proportion. Had this provision been in English Acts, the Gas Regulation Act would have been unnecessary.

CHARGING BY THE THERM.

One of the provisions of the Act was that gas in future should be charged for at per therm (100,000 B.Th.U.), instead of per 1000 c.ft. He was sorry that the unit of charge should be altered, as it would simply confuse the ordinary consumer, and add nothing to his information, provided, as was now generally the case, a calorific standard was adopted. The meters registered cubic feet; and it seemed reasonable that the charge should be for the unit registered. That a calorific standard should be universal, rather than one of illumination, had been long recognized; and in their case it had been the practice for several years. He thought generally the gas industry would prefer that the unit should remain 1000 c.ft., rather than that the therm should come into use; and he imagined that if the Board of Trade had realized the difficulties involved—not serious, but almost certainly irritating—they would not have agreed to the adoption of the therm. Further, it would make the rapid granting of Orders more difficult. He would like humbly to suggest that, in order that the benefits of the Act should become operative speedily, the Board, after deciding on the increased cost of manufacture and distribution of gas, should issue a General Order that all statutory gas undertakings be forthwith allowed to increase the standard or maximum price by that amount—thereafter, if necessary, taking each case separately. The provisions of the Gas-Works Clauses Act would protect the consumer from extravagant charges in the case of maximum-price companies such as their own; and with regard to companies governed by a standard price and sliding-scale, there might be a limitation (until each case was gone into in whatever detail was necessary) to the pre-war dividend.

CALORIFIC VALUE OF GAS AND THE CONSERVATION OF COAL.

In future gas undertakings would have to declare the calorific value of the gas they would supply, as he had already stated had practically been done in many cases. He trusted that, as knowledge on the subject became more exact, the calorific value of gas supplied throughout the country would be fixed with one object—viz., the conservation of coal. The gas industry were carrying on their business more than ever before on scientific principles; and they were not by any means at an end of their economies in gas manufacture. He was hopeful that they would before long find the use of solid fuel almost discarded, and practically all heating be done by gas, thereby avoiding much arduous and costly labour. The shareholders would pardon his speaking at such length; but he only wanted to assure them that he believed the industry was a particularly live and healthy one, and that they could reasonably expect for it a prosperous future. Gas supply was a Government controlled monopoly; and there never could, or should, be any profiteering in it (to use a horrid word, never, he was glad to say, applicable to them). But gas undertakings had been, and, in his opinion, would remain, safe investments, if properly and wisely managed.

GOOD RESULTS AND AN EXCELLENT STAFF.

At the last general meeting, he told them the Board hoped to be able to establish a pension fund on satisfactory lines. The uncertainty as to Government action in this matter made it difficult to decide what to do; but the subject was still having the careful attention of the Board. To the vacancy at Holywell, caused by the transfer of Mr. E. A. Sainsbury to Trowbridge, the Directors had appointed Mr. A. T. Howard. In conclusion, he would like to say that the working results generally were good; and they had a most excellent staff, in whom they had perfect confidence. One figure he would mention, to show how carefully the distribution work was looked after, was that the gas unaccounted-for, taking the average of all the stations, was only 3·93 p.ct.

When they remembered that at the Potteries they were largely supplying in a mining area, this figure showed that there could be no want of attention in this important part of the work. He had much pleasure in moving that the report and accounts be received, adopted, and entered on the minutes.

Mr. Frederick Wilkin formally seconded the motion.

Mr. R. Stevens inquired what was the present position at the Potteries. He said he had noticed in a paper some time ago that the local authority seemed anxious to buy them out.

The Chairman remarked that he had referred to this matter at the last meeting, when he said that the Company had been approached as to selling their undertaking; and he told them at that time the Board were quite determined to do all they could to retain their property. They were still of this mind.

Mr. W. J. Liberty said they were no doubt all very pleased with the tenor of the report. With regard to the Gas Regulation Act, he would like to know what effect this would have upon their dividend; and also whether they proposed to approach the Board of Trade at once, or later on, with reference to the calorific power of their gas.

The Chairman said, in reply to the first part of the question, they hoped the effect of the Gas Regulation Act would be that the Board of Trade would increase the maximum price of gas to the extent of the extra cost of production, which should enable them to earn their full parliamentary interest at all the stations. As to the other query, the Company had already adopted a calorific power standard, by Special Order of the Board of Trade. The only difference under the Gas Regulation Act was that, while the calorific standard would remain, the gas would be sold under a different unit—the therm, instead of per 1000 c.ft. The Directors would approach the Board of Trade at the very earliest opportunity. They were unable to do so yet, because the Board of Trade were unable to consider the cases; but they would not delay a moment longer than necessary in securing the advantages of the Act.

The resolution was then put, and carried unanimously.

The Dividends.

Moved by the Chairman, and seconded by Mr. F. Wilkin, it was agreed: "That the payment by the Directors of the dividend at the rate of 7 p.ct. per annum on the cumulative preference shares of the Company, as mentioned in their report of Sept. 13, be confirmed."

The Chairman then proposed that a dividend on the ordinary shares at the rate of 20s. per share for the half year ended June 30, less income-tax, be now declared, to be payable on Oct. 8.

Major-General W. T. Corrie seconded this, and it was agreed to.

Annual Meetings.

The Chairman said the next resolution was: "That the general meeting of the Company shall be held once in every year, instead of half-yearly as heretofore, and that such meeting shall be held at such time and place as the Directors shall determine, but so that not more than fifteen months shall elapse between the holding of any two successive meetings." As the shareholders knew, this resolution was foreshadowed in the report. The Directors had had no criticism whatever of the proposal, and therefore assumed the shareholders approved of it, for the reasons given in the report.

Mr. Henry Pullman, who seconded, said that his personal opinion was that it was a very wise and prudent suggestion. It would save the Directors and shareholders a lot of trouble, and the Company a lot of expense. In connection with one of the Suburban gas companies of which he had the honour of being Chairman, the same suggestion was put forward, and met with the unanimous support of the shareholders; and they were only precluded by their Act of Parliament from carrying it into effect.

The proposition was agreed to.

The Retiring Directors and Auditors.

The Chairman said he had now a very pleasant duty to perform, and that was to propose the re-election of Mr. Frederick Wilkin, a retiring Director. The Board felt the enormous benefit they received from Mr. Wilkin's very ripe judgment. It would be recalled that Mr. John Wilkin (Mr. Frederick Wilkin's father) served the Company as a Director for 51 years; and Mr. Frederick Wilkin had been on the Board 45 years. This was a unique record; and the Directors were wishful to do something in the way of specially commemorating it. Mr. Wilkin, however, would not consent to their making the proposition which they had hoped to do. They had now asked him to consider during the coming twelve months whether he would not let them do something at the next meeting.

Major-General Corrie, in seconding, said he could do nothing but endorse fully all the Chairman had said with regard to Mr. Wilkin's services.

The motion having been heartily passed,

The Chairman proceeded to propose the re-election as a Director of Mr. Harold G. Palmer. He remarked that Mr. Palmer, as they knew, bore a name which had been honoured in the records of the Company for a very long time. Mr. Palmer himself never shirked his duties; and the Directors were very proud that one of their number should have enlisted as a private and fought in France. Besides very considerable knowledge of gas matters, Mr. Palmer had a wide general engineering knowledge; and he was always ready to assist the Company in any way he could. As Chairman, he (the speaker) had always felt that he could rely upon Mr. Palmer at any moment to visit any of the stations; and he frequently did so, and gave the Board valuable reports.

Mr. L. R. Abbey-Williams seconded the motion, which was cordially agreed to.

Proposed by Mr. Kenneth R. Mackay, seconded by Mr. Liberty, Mr. E. Knowles Corrie was re-elected an Auditor; while Mr. William Cash was similarly re-appointed, on the motion of Mr. Chas. Webb, seconded by Mr. Stevens.

Votes of Thanks.

Mr. Pullman said he was sure of the approval of the whole of the shareholders in expressing deep regret at the indisposition of Mr. Gardiner. They would all desire that their sympathy should be conveyed to Mr. Gardiner, with wishes for speedy and complete restoration to health. He would speak with equal confidence on behalf of the assembled shareholders in tendering their most cordial thanks to the Chairman and Directors for the splendid report that had been submitted for the past half year. He could speak with a certain amount of authority, having been associated with the gas industry for very many years. The Directors were specially to be congratulated upon their report, seeing that many gas companies were paying no dividends at all, and many very reduced ones. They had the most complete confidence in the way in which the affairs of the Company were managed; and he begged formally to move that a hearty vote of thanks be accorded to the Chairman and Directors. At the same time, he would like to put in a word of praise for the staff, whose excellent services had conduced so largely to the success of the undertaking.

Mr. William Hill, in seconding, said he came from North Staffordshire, and knew something of the Company's business, and the very excellent manner in which it was conducted.

The Chairman, in returning thanks for the vote, said he thought the Company were in a thoroughly satisfactory position; and the staff had most ably supported the Board. He would therefore like to move that the cordial thanks of the meeting be given to the Secretary, officers, staff, and workmen. Such a report as had that day been submitted to the shareholders could only be presented when everyone did his share. They had in Mr. Brookes an official whom nothing escaped. He had been in the service of the Company for 42 years; and his interest grew stronger as his years of service grew longer. As to the engineers and staff, the Directors had every confidence in them. Throughout the industry, the British Gas Light Company was known as an excellent one to serve; and they had throughout their history had good servants, whom they had treated fairly. In the matter of workmen they were also well served. As he told the shareholders a year ago, they had in the Company a system of giving a medal and a £5 note to those who had served them 25 years. They had now over 250 employees who possessed the medal, and were proud of it. It was a small thing; but there was no doubt that it was appreciated, and had helped to maintain good feelings between the workmen and the staff. On all hands they were fortunate; and the Directors felt very grateful indeed that this was the position.

Mr. Palmer seconded, with the remark that he could add hardly anything to what had been said. Having been on some of the works recently, he could say that the managers were doing everything possible to produce the best results. The men likewise realized the intention of the Company to deal well by them, and therefore rendered their services more willingly.

Mr. Liberty said he would like to support the vote. Having been stationed at Hull for some years during the war period, he had had an opportunity of seeing what the Company were doing in difficult circumstances. There were complaints about many things in Hull, but few with regard to the way in which the consumers were supplied with gas.

The resolution was heartily carried, and acknowledged by Mr. Brookes, who said the whole of those serving the Company knew they could always rely upon receiving the greatest consideration from the Directors and shareholders. The vote of thanks was very gratifying; and all included in it, whatever their duties or responsibilities, would be encouraged in their individual efforts to further the success of the undertaking.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Half-Yearly Meeting.

The Ordinary Half-Yearly General Meeting of the Company was held last Thursday—Mr. John Murphy, the Chairman, presiding.

The minutes of the last meeting were taken as read, and the seal of the Company was affixed to the register of shareholders.

The Chairman's Address.

The Chairman, in moving the adoption of the report [already published in the "Journal"] and statement of accounts, said he wished in the first instance to express his deep regret, and that of his colleagues, at the deaths of Mr. John E. Fottrell and Mr. John L. Scallan—two of the Directors. They were men of exceptional business ability, and took great interest in the affairs of the Company. The vacancies created had been filled by the co-option of Mr. J. MacVeagh, M.P., and the Right Hon. Lawrence A. Waldron, P.C.—selections which they felt assured would meet with approval.

The Accounts.

Turning to the accounts, he pointed out that the margin of profit earned for the half year was small in comparison with the total receipts; but in existing circumstances and the limitation placed on the dividend, the figures would not, he hoped, be regarded as unsatisfactory. He did not propose to go through every figure in the revenue account and balance-sheet; but he would just draw attention to, and explain, some of the salient features. In the first place, he was glad to report that there had been a very satisfactory improvement in the quantity of gas sold for all purposes—notwithstanding the advance in price of 1s. per 1000 c.ft. which they were compelled to make last January. The total increase amounted to almost 64 million c.ft. in the half year, of which about 29 millions was the additional quantity consumed through ordinary meters, 31 millions the increased quantity sold to prepayment consumers, and the remainder, 4 millions, the increase in public lighting. Secondly, they might take it that every item both of expenditure and income was materially larger than the corresponding figure; and while the total income had increased by about £105,000, the expenditure was higher by no less than £103,000.

Expenditure and Maintenance.

Capital expenditure had again substantially exceeded the credits. The expenditure amounted to £8115, while the deductions only totalled £3551. A portion of the outlay represented the cost of acquiring about half the tar-works site; and since the close of the half year

satisfactory negotiations had been concluded for the purchase of the remainder. It was, of course, essential, where any important manufacturing operations were being carried on, that fixity of tenure should be secured. There was an increase of £12,598 in the cost of coal and oil, compared with a year ago; but they were more than compensated for this additional outlay by the very satisfactory manner in which the residual products had been disposed of. The increase in receipts for coke and breeze alone amounted to £45,209; and the income from tar was larger by £7629, and that from ammoniacal liquor and sulphate by £1573. In the other items relating to gas manufacture there was nothing calling for special comment, with the exception of the unusually heavy charge for repairs and maintenance of works. Owing to the war, renewal of various sections of the manufacturing plant had necessarily to be postponed, with the result that arrears had accumulated. The time had arrived, however, when further delay would be unwarranted, and in some cases impossible—notwithstanding the largely increased cost. In addition to the vertical retort installation, contracts had been placed for some time past for renewals of the purifying plant, condensing plant, and tar-extracting and scrubbing plant; and the appropriate proportion of each of these contracts (corresponding to the work done or materials delivered) had been charged against the accounts of last half year. The debit in all amounted to nearly £43,000. The work in connection with resetting the retorts had again been entrusted to Messrs. Drakes, Ltd., of Halifax; and the proportion charged this half year amounted to over £10,000, against which there was no corresponding item in 1919.

REPAIRS AND RENEWALS.

Repairs of mains and services showed an increase of just over £2000, although this was not accounted for by the fact that they were called upon to renew any of their larger mains. Small renewals had been carried out; but the bulk of the extra cost was due to advances in labour, material, and cartage. The cost of repairs and renewals of meters was practically double that of the corresponding period—£27,405 this time, against £13,943 last. Half of the increase was due to the very much larger number of meters repaired at their own workshop. As to the remainder, a substantial portion related to the cost of fixing attachments to their prepayment meters. The object of this mechanism was to obviate, as far as possible, the laborious task of changing wheels when any variation took place in the price of gas. The balance was due to the extra cost of wages and material, and, to a small extent, new meters for renewals. Taking the total expenditure on distribution, after deducting the credits, it would be found that the increase amounted to £15,754, which was explained under the two heads already referred to.

PUBLIC LIGHTING.

In connection with the lighting and maintenance of public lamps a small profit had again been realized. While rents remained the same, rates and taxes were higher (in spite of reduced assessments), owing to increased rating. Management was also up by about 10 p.ct.; but this was merely due to accretions in the ordinary course. Under miscellaneous and special charges, the war bonus payable to employees had increased from £24,888 to £43,595, or an advance of 75 p.ct. This expenditure had now reached enormous proportions, and represented 1s. 2d. per 1000 c.ft. in the price of gas supplied to the community.

RECEIPTS AND DIVIDEND.

With reference to income, the net receipts from gas were higher by £46,686, of which no less than £16,000 was due to increased sales. Rental figures were also up—particularly receipts for prepayment meters and stoves, which showed a satisfactory improvement corresponding with the increase in the business. Bank interest had cost more, owing to the larger amount of working capital now required to carry on the business. However, after providing for this and debenture interest, and allowing for the credit on income-tax account, a dividend of £3 6s. 3d. p.ct. could be paid on the present occasion without encroaching on the carry-forward from the previous half year. With regard to the general balance sheet, their funds showed a reduction of about £4000, due to further depreciation in investments. Moreover, it is not surprising that the amount due to bankers and sundry creditors was considerably larger, owing to the substantial amount of renewal work on hand to which he had previously referred. On the other hand, stocks had increased by over £36,000; and total debtors by almost £33,000.

NEW STEAMERS.

Since the last meeting they had obtained delivery of their new steamer, the s.s. *Glenageary*, which was specially designed and constructed for their particular work. She had made a number of passages during the half year with satisfactory results, which appeared amply to justify the decision to carry their own coal. As the steamer took the place of the s.s. *Braedale*, which had been disposed of at a favourable opportunity, the profit realized on the sale had been applied in a reduction of the purchase price of the new boat. Recently they had placed a further order with the same builders for a sister ship to replace the s.s. *Ardri*, which, owing to her dimensions, could only discharge at their river berth. They expected delivery of the new coaster early next year.

GAS REGULATION ACT.

Perhaps the matter of greatest interest and importance just now was the fact that the Gas Regulation Bill was now an Act of Parliament; and under its provisions their undertaking would shortly be in a position to take the necessary steps to alter and amend some of its obsolete restrictions, and to step on to new ground, where more freedom would exist both in manufacture and trading, which they hoped and believed would promote development and still better service to the community. The Board of Trade had now authority to transfer the operations of gas undertakings to a heat-unit basis; so that their former methods of calculation and appraisement would soon have to be revised. They would have to calculate capital and working costs, not in terms of per 1000 cubic feet, but per therm of 100,000 British thermal units. They would have to speak of gas production as being so many therms per

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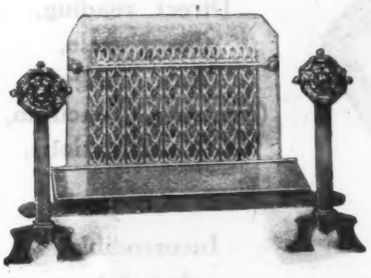

It is capable of both vertical and horizontal adjustment.

The difficulty of varying depths of grates is solved by means of a sliding trivet, which permits of the fire being pushed right-home into the interior. The fire can be fixed at any level—either on the hearth or on the bottom grate—by means of the vertical adjustment of the trivet and the two supporting dogs.

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ton of coal. They would have to charge in therms, and analyze costs and profits on the same basis. It would take a little time to get accustomed to this radical change; but when they had mastered it, there should be no difficulty, although it would entail more computation.

FINANCIAL REVISION.

Of immediate and great importance, too, were the powers of financial revision which had at last been conferred on the Board of Trade, and which would enable them to adjust the terms in the Company's existing Acts so as to conform with the new economic conditions. It must be said that much patience had been shown by the stockholders whose capital so rapidly ran a decadent course as soon as the prices of coal, all other materials, and labour, altered the balance of values. Applications would have to be made for Orders, both ordinary and special. They anticipated that the former would get priority; but at present nothing could be done pending the issue by the Board of Trade of their regulations, the appointment of Gas Referees and a Chief Gas Examiner, and the installation of the proper recording calorimeters, when the instrument to be used had been specified. However, so far as their undertaking was concerned, not a moment would be lost in seeking relief from the financial hardships which had for so long placed such a serious burden upon the stockholders. Of course, it would be quite apparent to them that the Board of Trade would not welcome, and could not be expected to deal with, an immediate avalanche of applications. It would be better for a start to be made by only a few undertakings applying to the Board, in the first instance, in order that they might get into proper stride in matters of principle, and of the particulars needed to enable them to make their decisions.

Mr. Davies, in seconding the motion, referred to the difficulties that would attend the bringing into operation of the new financial scheme, but expressed confidence that it would be of the greatest advantage to them. They had many troubles, but they were overcoming them; and the Company were, he felt assured, making excellent progress. He alluded in graceful terms to the ability of Mr. W. J. Grey, A.C.A., the Secretary and Accountant, and to his caution and discretion in respect of the duties entrusted to him.

The report and statement of accounts were then adopted.

THE DIVIDEND.

On the motion of the Chairman, seconded by Mr. Waldron, a dividend of £3 6s. 3d. p.ct. per annum, less income-tax, on the consolidated stock was declared—payable on and after the 9th inst.

Mr. J. M'Bride congratulated the shareholders on Mr. Waldron's appointment to the Board.

This concluded the meeting.

Borrowing powers for the Gas Department of the Dundee Corporation have been extended to £125,000.

BRENTFORD GAS COMPANY'S CHARGES.

Why an Increase is Necessary.

Reporting on the application of the Brentford Gas Company for an Order enabling the price of gas to be increased, the Parliamentary Committee of the Hammersmith Council say the application states that circumstances over which the Company have no control render it impossible for gas to continue to be supplied at the price permitted by the 1919 Order, except at a loss. The proposed increase in price is rendered necessary by the very large increases in the prices of coal, oil, and other materials which have taken place since the Order was made; while the charges for labour are said to have been increased by two agreements operating from Dec. 1, 1919, and May 1, 1920, respectively. Without a further advance in the price of gas, the Company point out that there would be a deficit on the revenue account of £11,100 for the half year ending Dec. 31, 1920. If to this deficit is added £16,112 for interest charges and £25,902 for dividends at three-fourths the standard rate on the preference and consolidated stocks, the total estimated deficit would be £53,114. The increase of 6d. per 1000 c.ft. as from Oct. 1, if it is authorized, is estimated to produce £31,500, leaving a deficit on the half year of £21,614, which deducted from an undivided balance after payment of dividends to June 30, 1920, of £48,521, leaves a balance of £26,907 to carry forward, after paying dividends at three-quarters of standard rate to Dec. 31, 1920.

In lodging formal objection to the application on behalf of the Council, the Committee have instructed the Town Clerk to urge (i) that provision should be made in any Order issued by the Board empowering the Board, upon the receipt of representations in writing to the Board not less than three months from the making of the Order by the local authority of any district in which any portion of the undertaking of the Company is situate, that in the circumstances then existing the price charged by the Company for gas should be revised, by Order in writing to alter, modify, or reduce such price; (ii) that the Board should make it a condition of applications of this nature that copies of the application and of the schedules and statements of account accompanying same should, as of right, at the same time be furnished to each local authority within the Company's area of supply.

Gas Coal Stocks.—The "Iron and Coal Trades Review" reports: "Gas fuels are in good demand. At many works there is still ample room for stocks to be increased to bring them up to what is considered a safety margin. The extended operation of 'daylight saving' will enable gas concerns to conserve their supplies better than would otherwise have been the case, as, for the time being, a considerable saving will be brought about in the evening consumption for lighting purposes. By the time we revert to 'Greenwich time' this will be largely counterbalanced by a larger morning consumption."

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STRIKE AT THE BERGEN GAS-WORKS.

The City of Bergen, in Norway, which has about 100,000 inhabitants, has lately been sorely tried by strikes; all Corporation workers "downing tools" after the Corporation had refused to yield to their excessive demands. Workmen belonging to the gas-works, scavenging department, cemeteries, water-works, electricity department, &c., walked out; officials only being left in charge of the plants. Some time ago a Citizens' Emergency Association was formed in Bergen, with the object of stepping-in when the community are in danger. This Association is non-political, and consists of citizens of the most varied occupations.

When the 250 odd gas-workers walked out, and left the Engineer and General Manager (Mr. John Irminger), with only half-a-dozen officials in charge of the works, the question arose of keeping-up the heats of the settings, and if possible supplying the town with gas. At the request of the Chairman of the Town Council (Mr. Ameln), the Citizens' Emergency Association, which was organized by Mr. John Blyth, rose to the occasion, and with splendid self-denial, and sacrificing private interests, offered to keep going any department the Corporation might wish.

On July 23, at midnight, the men walked out, and the police took the place of the ordinary watchmen at the gas-works. Next morning, at 8.30, the holders were nearly empty, and the town gas supply was shut-off entirely. The same evening five citizen volunteers began work at keeping the producers filled with coke. As the various coke-hoppers became exhausted, it required more men to keep the producers going. No coke was being produced in the ordinary way; and it had to be carried by hand. By Aug. 4 fifteen men were employed; and some of them at once underwent training in handling the various machines on the works.

On Aug. 8 the Chairman of the Town Council asked that steps should be taken to commence gas making, but said the supply to the town was not to be resumed until requested. The horizontal retort-house, which is supplied with De Brouwer electrical stoking machines, was then started; two settings being added per day. The different shifts were gradually broken in, and very little gas was made the first few days. Five days later the Glover-West vertical retorts began to be filled; and by Aug. 16 the holders were full of gas.

The volunteers were very anxious to supply the town with gas; and as the make had gradually increased to the normal, the Chairman of the Town Council was informed that the works would either have to open-up the town supply or shut-down again. As negotiations with the strikers did not meet with any success, in spite of the generous offers of the Corporation, the gas-works received orders to resume the gas supply; and at 4 30 p.m. on Aug. 16 the pressure distribution plant was put to work sending gas to the districts furthest away from the works, and driving back to a vent just outside the main governors at the works any air which had gradually filled the mains. At 10 p.m. rich gas appeared; and as all air had evidently been expelled, the main town governor was opened, and normal pressure given to the city. The gas had then been off for 24 days. Regular pressure was maintained, and more settings started as the consumption increased, until on Sept. 15 the strike was settled, and the original gas workers returned, after having accepted practically the original terms offered by the Corporation, and having been out nearly eight weeks.

The volunteers did remarkably well, and showed great determination in tackling their unaccustomed work. It was thanks to them that the daily output was larger at the time when the strike was settled than when the dispute broke out. During the greater part of the time very strong strikers' pickets were posted all round the works; and credit is due to the police for the way in which they protected the citizens, often under great provocation.

The citizen "shifts" were taken to the works in motor-boats (frequently pursued by strikers' picket motor-boats), by "Black Marias," and in numerous other ways. Up to 200 volunteers were at times employed at the gas-works, and in discharging a 3200-ton collier, which brought American coal to the works during the strike. Many of the volunteers who worked on the eight-hour night shift were employed in their offices in the day-time; while others who were freer to dispose of their time took the day-shifts at the works.

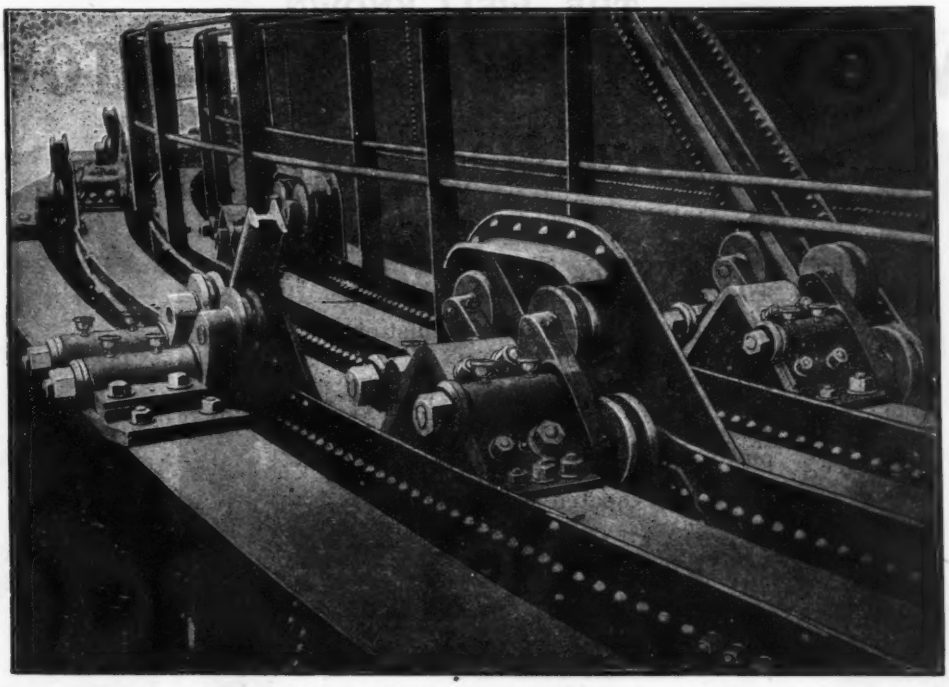
The Bergen Citizens' Emergency Association (called "Bergens Samfundshjalp") are still ready to take charge in case of any unscrupulous organization attempting to jeopardize the welfare of the community.

VERTICAL RETORTS INAUGURATED AT KILSYTH.

The formal inauguration of an installation of Woodall-Duckham vertical retorts at the Kilsyth Gas-Works began with an inspection of the works by the Town Council and a number of guests, to whom explanations were given by Mr. Jackson (a Director of the Woodall-Duckham Company), Mr. Flower (the Company's Resident Engineer) and Mr. W. Kellock (the Gas Engineer and Manager).

Afterwards, in the Town Hall, tea was served, and a short toast-list was gone through.

Mr. Doherty (the Convener of the Gas Committee), in proposing "The Contractors," said that the Committee, on the recommendation of the Gas Manager, agreed in 1914 to erect a new retort-house with a bench of vertical retorts. The Committee visited several works throughout the country, and, having inspected them, agreed to proceed with the erection of vertical retorts; but owing to the outbreak of war, power to borrow the money was refused, and the scheme had to be abandoned. When the war was over, the Council decided to proceed with the matter; and an order was given to the Woodall-Duckham Company to erect a new retort-house and the six vertical



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MANCHESTER.

retorts for £12,300. The retorts were built in single units; and each was capable of carbonizing 4 tons of coal, yielding some 50,000 c.ft. of gas, per 24 hours, or a total of 300,000 c.ft. per day for six retorts. The retorts, which were now finished and in full working order, he felt confident would give satisfaction. It had been a trying time during the erection of the retorts, owing to delays in getting the steel work and other fittings. The following comparison of the output of gas might be interesting. When the Council took over the works 34 years ago, the annual make of gas was 8,000,000 c.ft.; while the make of gas for the last pre-war year was 36,000,000 c.ft. The new retorts, it was expected, would suffice for Kilsyth for a long period, as three retorts were quite capable of supplying the requirements at present. So that ample provision had been made for a large increase in the consumption of gas. The plan of erection also permitted of the building of additional retorts, if necessary, with the same plant and machinery. The new retorts would, it was expected, produce a greater yield of gas with at least 25 p.c. less coal. It had also the advantage of lighter labour. The Contractors deserved credit for the manner in which their work had been carried out.

Mr. Jackson, in replying, said Kilsyth really had got a plant very suitable for its needs. It would turn out not only all the gas they now needed, but also very much more. At Cupar in 1914 they installed similar plant; and a few days ago the Cupar engineer told him he was more satisfied with the plant than he was four years ago, and he had not spent a farthing on plant maintenance in these four years' working. There was no reason why Kilsyth should not have the same or even better results than they had at Cupar. They had the necessary skill in their manager to do the same; and he only hoped Mr. Kellock would be able to spend the same amount of time upon the Kilsyth plant as the Cupar manager did. At Cupar the results were really excellent. They were getting an extraordinary make of gas per ton, and their coal bill was comparatively little. Provided the time could be given to it, the Kilsyth plant should really do better, because it had improvements which the experience of years of working had showed were useful in making the very best of the plant his firm had provided Kilsyth with.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Oct.* 4.

The market for pitch continues to show great strength; there being a very considerable demand. Makers' prices are not below 220s. per ton f.o.b. works. Dehydrated tar and oils are also in demand. Creosote is firm at about 1s. 4d. per gallon. Pure benzole and pure toluole are firm at about 4s. to 4s. 3d. per gallon; 95-160 solvent naphtha is about 3s. 6d. per gallon. Pyridine bases are quiet; makers' idea of price being about 20s. per gallon.

The price of sulphate of ammonia to dealers for October is £24 13s. 6d. per ton, basis 23¾ p.ct.

Tar Products in the Provinces.

Oct. 4.

The average values for gas-works' products during the week were: Gas-works coal tar, 121s. 6d. to 126s. 6d. Pitch, East Coast, 217s. 6d. to 220s. per ton f.a.s.; West Coast—Manchester, 192s. 6d. to 195s.; Liverpool, 192s. 6d. to 195s.; Clyde, 192s. 6d. to 195s. nominal. Benzole 90 p.ct. North, 3s. 2d. to 3s. 3d.; crude 65 p.ct. at 120° C., 2s. 3d. to 2s. 5d. naked at makers' works; 50-90 p.ct. naked, North, 2s. 4d. to 2s. 6d. Toluol, naked, North, 2s. 6d. to 2s. 7d. nominal. Coal tar crude naphtha in bulk, North, 11½d. to 1s. Solvent naphtha, naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 3s. 4d. to 3s. 6d. Creosote, in bulk, North, liquid, 1s. to 1s. o½d.; salty, 11½d. to 1s. Heavy oils, in bulk, North, 1s. to 1s. o½d. Carbolic acid, 60 p.ct., 3s. 11d. to 4s. Naphthalene, £40; salts, £9 to £9 10s., bags included. Anthracene, "A" quality, 1s. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is not much change in general conditions, apart from a further small advance in pitch, the strong tone in which seems to be increasing. In many quarters, though no pronounced fall is anticipated this year, it is thought that any further advance will restrict trade. At the same time, others say the only way by which these apparently extravagant prices can be reduced is to increase the production of fuel all over the world. Until this is done, it is impossible to say to what extent the price of pitch will be carried. Tar quotations are higher, and naphthalenes are still inquired for—firelighter makers being very anxious to buy crudes. There is also a strong export demand; but the quantity on offer is so small that neither of these demands can be fully met. Among naphthas, solvent is in rather more request, but mainly for future delivery. In view of coal strike uncertainties, sellers do not care to commit themselves. Creosote is firm and dearer; some makers quoting up to 1s. 6d. for best quality. Cresylic acid is steady; but carbolics are still flat and rather weaker, if anything. No new business is coming to hand; but the main cause of weakness is the number of parcels of crystals being returned from Japan for resale. Motor benzole continues to move well. Pure benzole and toluol are scarce. Intermediate products do not change to any great extent.

The range of quotations is as follows:

Benzole: 90% London 3s. 5d. to 3s. 7d., North 3s. 4d. to 3s. 6d.; 50-90% 2s. 8d. to 2s. 10d. London, 2s. 7d. to 2s. 9d. North; crude 60-65%, 1s. 7d. to 1s. 9d.; pure, 4s. per gallon naked.

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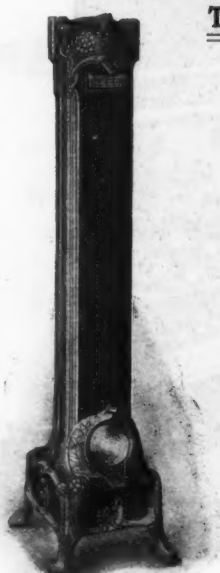
"WILSON" FLUELESS GAS STOVES.

The "Reed" Radiator.



A really hygienic Gas-Heated Radiator.

NO FLUE required.

Cooled products of combustion escape at floor level.

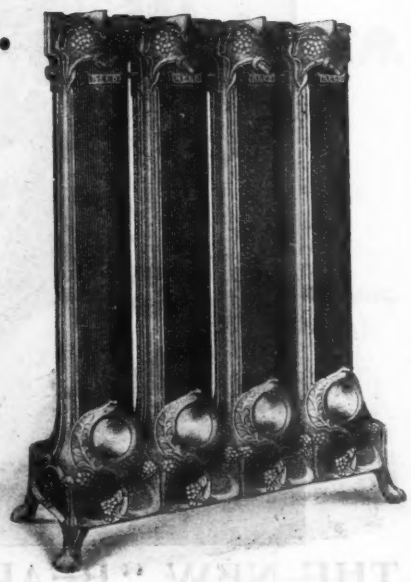
The air is heated without mixing with the products; therefore is pure.

Each tube heated with plain gas jet.

Size of single tube:

37 ins. high × 9½ ins. wide × 10½ ins. deep.

A single tube should heat a space about 10 ft. × 10 ft.



SINGLE. MULTIPLE.

WILSONS & MATHIESONS, Ltd., Carlton Works, ARMLEY, - - LEEDS - -

London Showrooms: 76, Queen Street, Cheapside, E.C.4. *Paris:* 23, Rue d'Hauteville.

Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 117s. 6d.; North, 105s. to 115s. per ton *ex* works. Refined tar, 95s. per barrel (free) on rail.

Pitch: London, 225s. per ton f.o.b.; East Coast, 215s. per ton; West Coast, 215s., with Manchester 200s. per ton, and Glasgow 210s. per ton; South Wales, 222s. 6d. per ton.

Solvent Naphtha: London, 3s. 3d.; Provinces average 3s. per gallon.

Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 3s. 6d. per gallon.

Naphthalene: Refined flake, £60 per ton nominal; inferior, £35; crude, £18 to £35 per ton, according to quality.

Toluol: Naked, 2s. 11d. per gallon nominal. North, 2s. 9d. Pure, 4s.

Creosote: London, 1s. 2d. to 1s. 3½d.; North, 1s. 2½d.; heavy oil, 10½d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Pyridine: 20s. to 25s. per gallon.

Aniline Oil: 1s. 11d. per lb., drums extra.

Aniline Salts: 2s. 2d. per lb.

Cresylic Acid: 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. 6d. to 5s. 9d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. 3d. per gallon; crystals 40%, 9d. per lb. nominal.

Salicylic Acid: Technical, 2s. 7d.; B.P., 3s. 3d. per lb.

Xylol: Pure, 6s. 9d.; commercial, 5s. 9d. per gallon.

Sulphate of Ammonia.

In the home trade, movements are relatively normal; but a large consumption is being looked for next season. The export trade is reported not quite so good as formerly; but business here is probably restricted pending a clearer outlook as to the coal situation, which still dominates the market. News from America is that weakness in the nitrate of soda market there has reflected a firmer condition for sulphate of ammonia, due to the fact that this item is somewhat cheaper on the ammonia basis. Spot material was recently offered in fairly good quantities in bulk, and also in double bags for export purposes; but the demand was not sufficient to cause any material strengthening of the market. In the resale market, material for forward shipment is limited among second hand; and prices are therefore firmer for the balance of this year and early in 1921.

Manchester Corporation and the Stretford Gas Company.—It has been decided by the Parliamentary Committee of the Manchester Corporation to recommend the City Council to promote a Bill to acquire the undertaking of the Stretford Gas Company. It was also decided to insert a clause in the Bill to acquire land in the parishes of Partington and Carrington on which to erect large distributing plant. The scheme is expected to cost something like £750,000.

Torquay Gas Company.

Addressing the shareholders at the half-yearly meeting of the Company, Mr. A. Iredale (the Chairman) told them that the consumption of gas had increased by leaps and bounds, and was still increasing; the half year showing a gain of 11,289,000 c.ft. Sales of bye-products showed an additional yield of £3191; and of this sum tar alone brought in an increase of £557. On the other side, however, coal cost £4164 more than in the corresponding half of 1919; oil, £945 more; wages, £1226 more; and repairs and maintenance, £432 more. These and other items almost depleted the substantial gains on the revenue side. The total income for the half year was £34,182; and the expenditure £34,158. During the period of the war, and since, the burdens of the Company had become almost intolerable. Since 1913 coal had increased in cost to the extent of 225 p.ct., oil 313 p.ct., retorts 157 p.ct., firebricks 133 p.ct., wrought-iron pipes 233 p.ct., cast-iron pipes 252 p.ct., cooking-stoves 105 p.ct., gas-fires 165 p.ct., gas-meters 133 p.ct., stokers' wages 178 p.ct., wages of yard labourers 220 p.ct., gas-fitters 186 p.ct., and main-layers 280 p.ct. While these heavy increases had fallen on them, the price of gas had been advanced by only 125 p.ct. As regards wages, they had reached the limit of endurance. During the ten months preceding May last every cubic foot of gas sent out from the works was supplied at a positive loss, and the more they supplied the more they lost. The income and expenditure for the six months had not yielded sufficient profit to pay their ordinary dividends; but during years of prosperity they had accumulated reserves, which they would draw on for a portion of the dividends. He took an optimistic view of the future of the gas industry. He looked with confidence to better times for the shareholders, when full dividends would be resumed. He moved that payment on account of dividend should be made for the half year of 7½ p.ct. per annum on the 10 p.ct. shares, and of 5¼ p.ct. on the 7 p.ct. shares. This was agreed to.

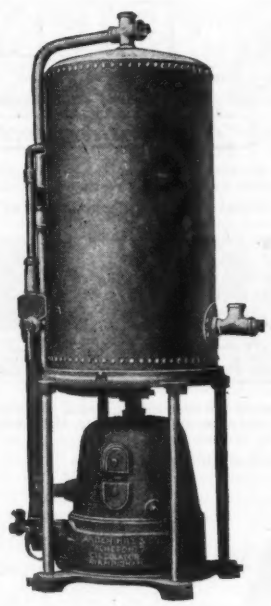
Manchester Gas Committee's Borrowing Powers.—In a report made to the Manchester Corporation, the Finance Committee refer as follows to the Gas Committee's application for borrowing powers: On June 4, 1919, the Council approved a report of the Gas Committee recommending an expenditure of £921,100 on manufacturing and distributing plant. As the balance of powers available was only £595,000, the Council directed that an application be made to the Local Government Board to borrow this amount. Before the balance could be borrowed—namely, £326,100—it was necessary to obtain an extension of the powers under the Orders of 1893, 1899, and 1904; and therefore the Ministry of Health have issued an Order, which has now received the confirmation of Parliament, increasing the general borrowing powers under the above Orders by £1,000,000, subject to the sanction of the Ministry of Health. It is now necessary to make formal application for the sanction of the Ministry of Health to borrow the sum of £326,100.

ARDEN HILL & CO.'S

"ACMEFONT"

Builders' Set

A COMBINED HOT-WATER CIRCULATOR AND STORAGE TANK - GAS-HEATED.



Fitted with a patent "Thermostat" which automatically controls the gas consumption, and with an "Economy" valve which enables the full storage capacity or five gallons only to be in circulation at once. When supplied for hard-water districts the interior of the Boiler is treated with a special "Noncrust" preparation which prevents lime deposits adhering in hard immovable lumps to the internal metal parts.

Storage capacity: 10, 20, 30, or 40 gallons.

Supplied on high or low stands.

ARDEN HILL & CO.,

"Acme" Works - BIRMINGHAM.

Claim Against a Gas Manager.

At the Leek County Court last week, Frederick Swarbrick, of Basingstoke, and formerly Electrical Engineer to the Leek Urban District Council, claimed £45 7s. 4d. from Mr. R. H. Ginman, the Leek Gas Manager, for services rendered in respect of articled pupils at the Electricity Works. Mr. A. H. Shaw appeared for the defendants. Mr. Swarbrick, who conducted his own case, said he commenced his duties at Leek on June 10, 1917, when he was met by Mr. Ginman, who told him there were two articled pupils at the department—one who had paid a premium of £60, and another whose premium was to be paid by instalments; and it was arranged that he should receive it. He asked for it several times; but failed to get it. Mr. Ginman had had control of the electricity works; but witness said he had no qualifications to instruct pupils. Witness left Leek in June, 1919; and it was understood that he should be compensated. Mr. Ginman said he had charge of the works in 1916, and took over the two pupils. When Mr. Swarbrick took charge, he told him one pupil had paid £60, and the other £20—leaving £40 to come. The Council wished to retain the £60; and it was intended that Mr. Swarbrick should take future premiums. The parent of one of the pupils complained that his son had no instruction for two months, that the plaintiff had promised to give him three nights a week, and agreed to the indentures being transferred. Hearing that there was friction, he wrote to the Committee to say that if Mr. Swarbrick wanted the money he could have it. Mr. Swarbrick then said he did not want it; and no application was made for it. The Chairman of the Leek Urban District Council (Mr. W. A. Furmstone) said the duties were fully explained to Mr. Swarbrick, as well as the position with regard to the pupils. It was agreed that Mr. Ginman should retain the £60, and that plaintiff should take £40, for the other pupil. The matter was thrashed out by the Committee; and the plaintiff said distinctly that Mr. Ginman could keep the fees. His Honour decided that the plaintiff had not made out his claim, and gave judgment for the defendant.

Price of Gas Increased at Smethwick.—Alderman Pinkney (the Chairman of the Smethwick Gas Committee) told the Town Council that he was exceedingly sorry to have to move a resolution increasing the price of gas 3d. per 1000 c.ft. to all classes of consumers. The Committee had struggled on for a considerable time hoping that they would be able to get through without any further advance. He had explained last year that the Committee made a net profit of only £2000; and but for the fact that they had about £4000 extra from the sale of tar they would certainly have had a loss on the year. The present advance was necessitated by the increase in railway rates on coal, which was 3s. 6d. per ton, representing £9100. From the increased price of gas they obtained 3s. per ton, representing £4100, and leaving £5000 to be provided. The increase in wages of 6s. per week, *plus* 12½ p.ct., represented £4000, making a total of £9000; while the proposed increase of 3d. only represented an extra income of £8750; so they would still be behind, unless they got more for residuals.

Coke-Oven Gas for Ossett.

A Ministry of Health inquiry was held at Ossett last Wednesday into the Corporation's application for power to borrow £14,290, for the installation of plant, mains, &c., to enable the Corporation to obtain gas from the coke-ovens of Benzol and Bye-Products, Ltd., at the Crigglestone Colliery. The Company, it was stated, are prepared to sell gas at from 8d. to 9d. per 1000 c.ft., which would enable the Corporation to supply their consumers very cheaply and lead to greater demand, especially for power. Owing to the poor coal available, it was with difficulty that the local gas-works had produced a sufficient supply last winter; and it would be impossible to meet the demands of the coming winter from these works alone. Crigglestone Colliery, it was stated, is within the Ossett gas area, and about 4½ miles from the gas-works. There is a surplus of gas of high calorific value from the coke-ovens of from 500,000 to 750,000 c.ft. per 24 hours. It was proposed to lay an 8-in. steel main from the colliery to the gas-works, to convey the gas for purification, storage, and distribution; the Company undertaking to put it into the main at sufficient pressure to deliver it into the holders at the works. Coal equal to the 10,752 tons carbonized at the gas-works last year could be saved. The estimate of Mr. A. E. Mottram (the Gas Manager) of the cost of carrying out the work was considerably less than the tenders received; and the Council intended to do the work by direct labour. There was no opposition at the inquiry.

Smoke Nuisance at Todmorden.—The Todmorden Town Council have decided to go through the farce of threatening one of their own departments for smoke nuisance. The offending department is the electricity undertaking, which has been given notice to abate smoke nuisance and prevent its recurrence. If the electrical people do not obey, one can only suppose that the Corporation will summon the Corporation at the local Police Court, and the Corporation will be ordered to pay a fine to the Corporation! This is exactly what happened at Bradford, in connection with the electricity department, some years ago.

Cirencester Gas Company, Ltd.—The Directors report that the revenue account for the year ended June 30 shows a profit of £1020, an increase of £152 on the previous year. Interest on the debentures and interim dividends of £4, £2, and £2 16s. on the several classes of shares have been paid; and the Directors recommend further final dividends at the same rates. The consumption of gas for the year was 44,023,200 c.ft., a slight decrease on last year's figure. The price of coal still rises; and the cost for the year amounts to no less than £11,331, an increase of £2618 over the previous year. This continual rise, coupled with increased wages, adds materially to the expenses of production. On the other hand, the gas-rental was higher, and residual products realized more; and the Directors have thus been enabled to continue the price of gas at 6s. per 1000 c.ft. A carburetted water-gas plant has been installed during the past summer, and will shortly be in operation. It is hoped that it will effect a considerable saving in coal and labour.

A TRIUMPH FOR BRITISH ENTERPRISE.

THESE UNIQUE PRODUCTS

Synchronise the requirements of the concrete age and will revolutionise building construction.

NOVOID
THE CONCRETE PROOFER
REGISTERED TRADE MARK

A powder which chemically acts upon Portland cement, and renders concrete weather, water, and oil proof by filling the voids with insoluble silicates.

"Novoided Concrete is Bone Dry under Pressure."

RENCRETE
REGISTERED TRADE MARK
The Weatherproofer

A solution similar to Everok, in a variety of practical shades, for proofing brick, plaster, stucco, etc., and rendering concrete decorative as well as weatherproof.

"The First Successful Effort in Cement Stains."

EVEROK
THE WATERPROOFER
REGISTERED TRADE MARK

A colourless solution on the Novoid principle for proofing and hardening existing cement, concrete, brick, etc. Eminently suitable for concrete floors, to prevent "dusting up," as it

"Sets Like a Rock."

QUELLE
REGISTERED TRADE MARK
THE FLAMEPROOFER

A preservative stain made in colours, to represent pitch pine, oak, walnut, etc., which renders woodwork fire, moisture, and rot-resisting, and prevents even green timber from shrinking or swelling.

"A Perfect Primer for Enamel."

BOOKLET POST FREE BY STATING THIS PAPER.

AURORA
REGISTERED TRADE MARK
DISTEMPER

The latest and most economical water paint. Supplied ready for the brush. Surfaces 640 yds. per cwt. on "Sirapite." Being "colloidal" in action, it becomes an integral part of the plaster itself.

"A Really Washable Distemper."

WRITE FOR TINT CARD AND PRICE LIST POST FREE.

"THE KEENEST CRITICS HAVE BEEN CONVINCED THAT WHAT IS NOW PUT BEFORE THEM IS THE TRUTH."

THE TORBAY & DART PAINT COMPANY, Ltd., 26-28, Billiter St., LONDON, E.C.3

An Award to the Davis Gas-Stove Company.—At the exhibition of the Café and Restaurant Union recently held at the Crystal Palace, Amsterdam, the Davis Gas-Stove Company, Ltd., secured the highest award—namely, a gold medal—and the congratulations of the jury, for their exhibit of gas-fires and other apparatus.

Next Birmingham British Industries Fair.—The Birmingham Section of the 1921 British Industries Fair is again being organized by a Joint Council of the Birmingham Corporation and the Chamber of Commerce; and space is already being rapidly booked-up. In fact, the General Manager (Mr. Charles Stanley) is experiencing no difficulty in this respect. Practically the arrangements will be as last year—that is gas-fittings and appliances, cooking and heating apparatus, &c., will be included among the exhibits. The fair is to be held in the West Bromwich Aerodrome. Full information as to space available, &c., can be obtained on application to the General Manager, British Industries Fair (Birmingham) 1921, Chamber of Commerce Building, No. 95, New Street, Birmingham.

South African Lighting Association, Ltd.—At a meeting of the Directors of this Company held at the London office on the 29th ult., it was resolved to pay an interim dividend of 4 p.ct. (8 p.ct. per annum), less income-tax, on the 27th inst., to shareholders registered on the books of the Association on Sept. 29. The dividend is at a similar rate to that paid a year ago.

Irish Gas Supplies.—Owing to the extensive malicious burnings attributed to "uniformed men," and designated as reprisals for the shooting (in many instances fatally) of Police Commissioners, inspectors, sergeants, and constables, the gas supplies in Irish towns affected have had to be cut off or connections diverted. There is necessarily a diminished consumption of gas in most areas—that is, where the supply is not entirely held up meanwhile—and local authorities are puzzled as to what steps should be taken in the unprecedented circumstances. In Belfast—the scene last week, unfortunately, of renewed rioting—disturbers of the peace have revived an olden practice at night by extinguishing the public lamps before indulging in attacks.

STOCK MARKET REPORT.

BUSINESS on the Stock Exchange last week was much on a par so far as the volume of business was concerned, which did not amount to much; and the tone was variable throughout. Things would brighten up a bit at one time, as a ray of light and hope would pierce the sombre horizon of the strike negotiations, and then would be dashed by apprehension of tightening money conditions. Next, the positions would be reversed, and money looked better; but there was a hitch in the Labour council chamber, and so things oscillated.

The gilt-edged market varied with the rest; but it wound up fairly well. The Big Four finished much the same as they had begun, Friday's figures being: Consols 45⅝-46¼, War Loan 84½-84⅝, Funding 67¼-67⅜, Victory 74⅝-75. War Bonds were supported, and Indian did fairly well; but corporations were not in much favour. Home rails were dull, and Argentines were lower; but Canadians closed steady. The Foreign Market was not strong—lines of all sorts giving way more or less. In the Miscellaneous Market, movements were irregular; but the prevailing direction was downward.

Business in the Gas Market was much more active than in the week before; but it was mostly monopolized by the three biggest undertakings. The tendency on the whole was not very good. In the London Companies, Gas Light ordinary and South Metropolitan had a fall of 2 each, and in the Suburban and Provincial groups South Suburban was also 2 lower, and Tynemouth fell 1. The feature of the week was the recovery of Imperial Continental, which rose from 123 to 136, with an advance of 8 in the quotation.

Bargains done for cash during the week were as follows: On Monday, Bournemouth "B" 9, 9 1/16, Brentford "A" 50, 52, British 21⅜, Gas Light ordinary 51½, ditto preference 55½, ditto debenture 47½, Imperial Continental 123, 123¼, 123½, 124, 124½, 125, 125¼, 125½, ditto debenture 85¼, South Metropolitan 62, 63¼. On Tuesday, Alliance and Dublin 40¼, 40⅜, Bournemouth "B" 9, 9 1/16, ditto 3 p.ct. debenture 46⅜, Gas Light ordinary 54½, 55¼, 55½, ditto preference 56½, Imperial Continental 125, 125⅛, 126½, 127⅓, South Metropolitan 62, 62½. On Wednesday, Gas Light ordinary 54, 55, 55½, ditto maximum 39, Ilford "A" and "C" 80, Imperial Continental 126⅛, 126⅜, 127½, 128, 128⅛, 130, 131, 132, ditto debenture 84½, Monte Video 71½, River Plate debenture 37½, 38, South Metropolitan 63, Wimbledon 43, 44. On Thursday, Gas Light ordinary 52, 53¼, 53½, 54, 55, Imperial Continental 132, 133, 134, 135, 135⅛, 136, Primitiva 10s. ditto preference 21s. 3d., 22s. 6d., South Metropolitan 61, South Suburban debenture 68, 68½, Wimbledon 43½, Woking District 5 p.ct. preference "C" 62½. On Friday, Bournemouth "B" 9 1/16, Gas Light ordinary 52½, 52⅔, 53⅓, ditto debenture 46½, 47⅓, Imperial Continental 132, 133, 133⅓, 134, Metropolitan of Melbourne 91, South Metropolitan 59½, 60⅓, 60½, 61⅓, 62, Tottenham preference 65, Richmond 5 p.ct. Consolidated 49¼, 49⅜.

The Money Market was in a state of keen activity and some excitement. Apart from normal requirements at the turn of the quarter, there was a very big demand for accommodation, and some borrowers of shorts had to pay up to 7½ p.ct. Discount, too, was very firm. The Bank rate is 7 p.ct., fixed on April 17.

Tenders have been accepted at Dundee for the construction of a new gasholder, the contract going to Messrs. R. & J. Dempster, of Manchester, at £53,649. The tenders ranged up to £57,210.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref.	...	56—61	...
1,551,868	,,	Mar. 26	2½	3 1/13%	Alliance & Dublin Ord.	59—64	38—43	40¼—40⅜
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	May 13	7½	8%	Bombay, Ltd.	5⅛—6⅛	4½—5	...
50,000	10	Aug. 12	16	5%	Bournemouth Gas and Water: 10 p.c.	29—30	8½—8¾	...
383,110	10	,,	7	7%	Bournemouth Gas and Water: B 7 p.c.	15—15½	8½—9¼	9—9 1/16
115,000	10	,,	6	6/-	Bournemouth Gas and Water: Pref. 6 p.c.	13½—14	7½—8½	...
162,065	—	June 25	—	4%	Bournemouth Gas and Water: 4 p.c. Deb.	...	62—64	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid.	261—266	50—55	50—52
734,920	,,	,,	11	26/3	Do. B New	204—209	47—52	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	68—73	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb.	91—93	60—63	...
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig.	208—213	120—125	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	78—83	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max.	...	...	...
530,000	20	Sept. 15	12½	10%	British	44—45	21—23	21½
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
243,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	42—45	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	...
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref.	4—6	5½—6½	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
137,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	54—59	...
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	...
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	27—32	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—50	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c.	...	125—135	...
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	...	85—95	...
492,270	Stk.	—	6	5%	Derby Con. Stk.	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd.	17½—18	7—8	...
16,298,975	Stk.	July 29	4/17/4	30/-	Gas Light and Coke: 4 p.c. Ord.	98—102	52—55	52—55½
2,600,000	,,	,,	3½	26/3	Gas Light and Coke: 3½ p.c. max.	76—79	39—42	39
4,062,235	,,	,,	4	4%	Gas Light and Coke: 4 p.c. Con. Pref.	96—99	55—58	55½—56½
4,674,850	,,	June 25	3	3%	Gas Light and Coke: 3 p.c. Con. Deb.	72½—74½	45—48	46½—47½
130,000	,,	Dec. 11	10	10%	Gas Light and Coke: 10 p.c. Bonds.	...	...	...
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 p.c.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	...
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16¼—16½	8½—9¼	...
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c.	...	87—89	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C	151—154	84—89	80
65,780	,,	,,	6½	3½%	Do. B	115—118	64—69	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb.	92—94	53—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	131—136	123—136
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	82—87	84½—85½
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c.	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. A.	211—213	...	...
					Liverpool 5 p.c. Ord. B.	146—148		...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	3½%	Maidstone 5 p.c.	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4¼—4½	1¾—2¼	...
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	86—93*	91
541,920	Stk.	May 27	4	6%	Monte Video, Ltd.	11½—12	70—75	71½
1,875,892	,,	July 29	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	60—61	...
529,705	,,	June 25	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—51	...
15,000	10	Sept. 15	—	8%	North Middlesex 10 p.c.	...	12½—13½	...
55,940	10	,,	7/14/0	5½%	,, ,, 7 p.c.	14—15	7½—8	...
300,000	Stk.	May 13	8	8%	Oriental, Ltd.	117—122	98—101	...
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅞	2—3	...
60,000	50	Aug. 27	13	7½%	Portsea Island, B	128—131	65—70	...
100,000	50	,,	12	6½%	Do. C	118—121	50—55	...
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	⅛—⅜	10/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	1—1¼	21/3—22/6
521,600	100	June 1	4	4%	Do. 4 p.c. Deb.	91—93	69—71	...
600,000	Stk.	July 29	4	4%	Do. ,, ,, 1911	...	40—42	...
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	38—43	37½—38
150,000	10	Sept. 30	6	6/-	San Paulo 6 p.c. Pref.	10½—11	6½—7½*	...
125,000	50	July 2	5	5%	San Paulo 5 p.c. Deb.	47—49	38—40	...
135,000	Stk.	Aug. 27	10	5%	Sheffield A	223—224	68—73	...
209,984	,,	,,	10	4%	Do. B	222—224	58—63	...
543,500	,,	,,	10	3½%	Do. C	220—222	53—55	...
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	...	...	...
90,000	10	Sept. 30	9	9%	South African	10½—11½	10½—11½*	...
6,609,895	Stk.	Aug. 12	5/4/0	30/-	South Met. 4 p.c. Ord.	111—113	58—63	59½—63½
250,000	,,	July 14	—	5%	Do. Pref.	...	91—93	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb.	72½—74½	45—47	...
224,820	,,	Aug. 27	8½	3%	South Shields Con. Stk.	157—159	95—98	...
1,087,795	,,	July 29	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	60—65	...
447,558	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	68—73	68—68½
647,740	,,	May 13	7½	3½%	Southampton Ord.	99—102	57—60	...
121,475	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000	,,	Aug. 12	—	3½%	Tottenham District: A 5 p.c.	135—138	6 ——	...
782,275	,,	,,	6	2½%	Tottenham District: B 3½ p.c.	115—117	53—58	...
181,255	,,	June 10	4	4%	Tottenham District: 4 p.c. Deb.	87—89	60—63	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Sept. 15	5	3½%	Tynemouth 5 p.c. max.	108½—109	69—71	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 27	8½	47/6	Wandsworth A 5 p.c.	151—156	75—80	...
255,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	53—58	...
108,075	,,	,,	—	33/3	Do. C	...	50—55	...
140,865	,,	,,	—	33/3	New Ordinary	...	50—55	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c.	117—122	43—48	43—44
98,000	,,	,,	6½	32/6	Epsom 5 p.c.	121—126	50—55	...
88,416	,,	June 25	3	3%	3 p.c. Deb. Stk.	66—69	44—47	...

*Ex Div.

Clonmel Gas Strike.—The strike of Corporation gas-workers at Clonmel, which had lasted five weeks, to the great inconvenience of the ratepayers both in respect of industry and general commercial and household requirements, has terminated with a reference of the wages claim to arbitration.

Electric Light Failures and Operations.—At Keighley, on the 29th ult., many residents and others were inconvenienced by a failure of the electric light service, owing to the fusing of wires in a street-main. Candles had to be brought into use wherever gas was not provided. At the local hospital two operations were in progress when the light failed in the late afternoon, and had to be finished in the half-daylight.

Price of Gas at Lancaster.—It was agreed at last week's meeting of the Lancaster Town Council to increase the price of gas from 3s. to 3s. 3d. per 1000 c.ft.; the Committee's recommendation of 3s. 4d. being defeated. It has been decided to open show-rooms in the old gas offices in Market Square. The statement of the Engineer (Mr. G. Dixon) for the last quarter showed that 54,426,224 c.ft. of gas was manufactured, an increase of 1,486,791 c.ft. The net increase from sales of gas was £1081 and from residuals, £3249. The gas made per ton of coal has increased by 112 c.ft., which the Chairman said was highly satisfactory.

Coventry and the Price of Motor Fuel.—A deputation organized by the local branch of the Automobile Association and Motor Union have submitted to the Mayor of Coventry a resolution in the following terms: "This deputation, representing all classes, professions, and trades in Coventry, views with the utmost concern the steadily rising price of motor fuel, and calls on you as Chief Magistrate to send urgent representations to His Majesty's Government pointing out the danger to the community, and requesting them to take immediate steps to secure the production and distribution of power alcohol within the Empire, under the immediate supervision and control of the Government; also to ensure that the coal consumed in this country shall be so treated before use as to extract all the possible available motor spirit." Subsequently the Coventry City Council passed a resolution to the same effect.

The Rothesay Town Council have increased the salary of Mr. William Whyte, their Gas Manager, by £100 per annum.

The Directors of the Bombay Gas Company have decided to pay an interim dividend at the rate of 8 p.ct. per annum (less tax) for the half year ended June 30, payable on Nov. 1. This is the same as a year ago.

Mr. L. J. Warren, who for the last eighteen years has been with Messrs. Willey & Co., gas engineers, of Exeter, has been appointed Manager and Chief Representative for the Manchester Branch of George Wilson Gas-Meters, Ltd.

Under the cumbersome title of "Ninety-nine per Cent. Efficiency Gas (Coal and Oil) System, Ltd.," a company was registered on Sept. 24, with a capital of £6000 in 50,000 preference shares of 2s. each and 20,000 ordinary shares of 1s. each.

The Borough Treasurer of Blackburn in his abstract of accounts summarizes the working of the trading departments. The gas-works showed an income of £238,566, and an expenditure of £233,827; and a profit of £4739. This profit will be carried forward to next year.

In response to an application from the gas-fitters for an advance in wages, in view of a recent increase in the general rate for plumbers, the Spenborough Gas Committee have decided to increase the fitters' wages to 1s. 11½d. per hour, *plus* 12½ p.ct. bonus, to date from Sept. 13.

Catalogues for the season 1920-21 of burners and lamps and of glassware, together with price lists, are being sent out to the trade by the Welsbach Light Company, Ltd., of Gray's Inn Road, W.C. In both catalogues there is illustrated a wide range of the Company's well-known classes of goods.

A verdict of "Death from natural causes" was returned at an inquest, at Hebden Bridge, on Henry Hull, who had collapsed while working on the gasholder belonging to the Hebden Bridge and Mytholmroyd Gas Board. Medical evidence was that death was due to heart failure caused by a fit of coughing.

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